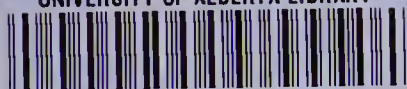


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HOLT MATHEMATICS SYSTEM

BOOK 5





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HOLT MATHEMATICS SYSTEM BOOK 5

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Printed in Canada

Creative art by Frank Hammond.
Assembly and technical art by David Hunter.
Chapter openings by Bob Seguin.
Consulting Editor Robert Devine
Production Editor Sharon Dzubinsky
Canadian Cataloguing in Publication Data

Bye, Marshall P., 1928-
Holt mathematics system, book 5

For use in grade 5.
Includes index.

ISBN 0-03-920037-X

1. Mathematics — 1961- I. Title.

QA107.B944 510 C80-094229-9

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The authors of the *Holt Mathematics System* wish to thank the following teachers for their invaluable comments and suggestions resulting from the Grade 5 pilot testing in their classrooms.

Jane Chabot
John Robson Elementary School
New Westminster, B.C.

Gordon Cook
Queen Victoria Public School
Hamilton, Ontario

Jim Harrop
George Lee School
Regina, Saskatchewan

Phil Lauzon
St. Monica's School
Barrie, Ontario

Marlene Leach
A. S. Taylor School
Scarborough, Ontario

Tom Rompf
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Chapter 1

Whole Numbers— Decimals

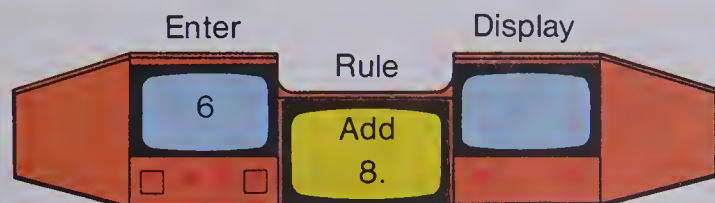
Place Value

Addition and Subtraction



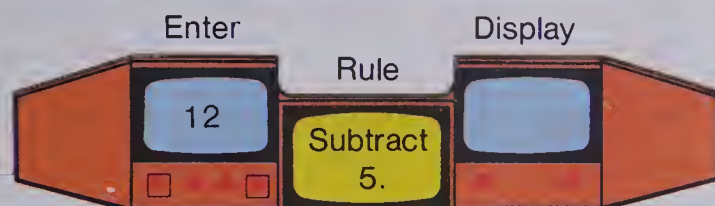
The Quiz Machine

Sandy and Murray know how to use the Quiz Machine.



Think: $6 + 8 =$

Write: $6 + 8 =$

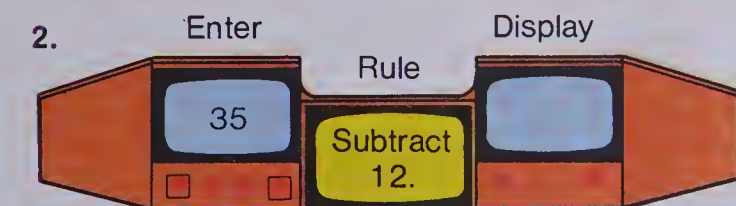
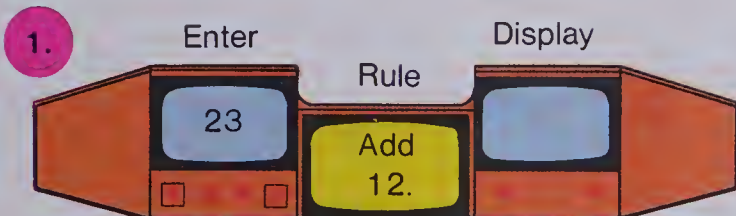


Think: $12 - 5 =$

Write: $12 - 5 =$

Exercises

Complete these Quiz Machines.



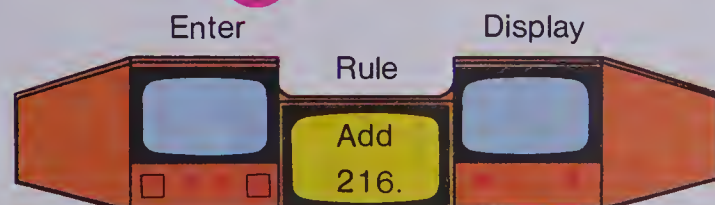
3. (a) Copy and complete.

Enter	Rule	Display
54	Add 26.	<input type="text"/>
80	Subtract 26.	<input type="text"/>
62	Add 31.	<input type="text"/>
93	Subtract 31.	<input type="text"/>
80	Add 19.	<input type="text"/>
99	Subtract 19.	<input type="text"/>

(b) What relationship do you notice in the above table?

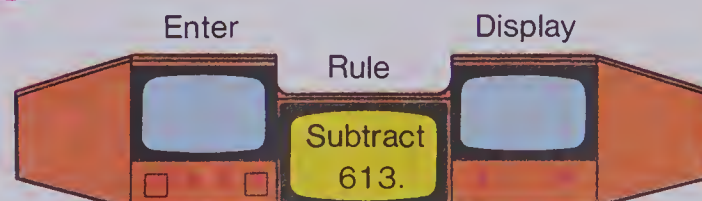
Enter each of the numbers in these Quiz Machines. Write a number sentence for each.

4. (a) 736 (b) 413 (c) 548 (d) 719



$$736 + 216 = 952$$

5. (a) 826 (b) 914 (c) 802 (d) 700

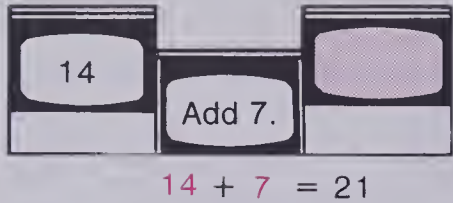


Follow My Rule

Follow the rules. Write a number sentence for each.

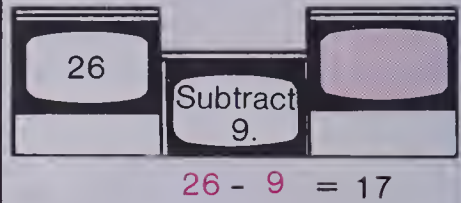
1. Rule: Add 7

Enter	Display
14	<input type="text"/>
8	<input type="text"/>
12	<input type="text"/>
34	<input type="text"/>
19	<input type="text"/>



2. Rule: Subtract 9

Enter	Display
26	<input type="text"/>
43	<input type="text"/>
19	<input type="text"/>
58	<input type="text"/>
31	<input type="text"/>



Write a number sentence for each.

3. Rule: Add 84.

Enter	Display
37	<input type="text"/>
22	<input type="text"/>
16	<input type="text"/>
12	<input type="text"/>

4. Rule: Subtract 36.

Enter	Display
39	<input type="text"/>
58	<input type="text"/>
225	<input type="text"/>
116	<input type="text"/>

5. Rule: Subtract 49.

Enter	Display
129	<input type="text"/>
98	<input type="text"/>
210	<input type="text"/>
400	<input type="text"/>

What is my rule? Copy and complete each table.

6. Rule: ?

Enter	Display
18	13
24	19
16	11
31	<input type="text"/>
13	<input type="text"/>
35	<input type="text"/>

My rule is .

7. Rule: ?

Enter	Display
12	27
3	18
9	24
32	<input type="text"/>
17	<input type="text"/>
21	<input type="text"/>

My rule is .

★ 8. Rule: ?

Enter	Display
7	16
18	27
3	<input type="text"/>
■	25
10	<input type="text"/>
■	38

My rule is .

Tune Up

1. (a)
$$\begin{array}{r} 37 \\ + 29 \\ \hline \end{array}$$

(b) $46 + 35$

(c)
$$\begin{array}{r} 85 \\ + 29 \\ \hline \end{array}$$

(d) $67 + 58$

(e)
$$\begin{array}{r} 49 \\ + 34 \\ \hline \end{array}$$

2. (a)
$$\begin{array}{r} 87 \\ - 20 \\ \hline \end{array}$$

(b) $52 - 38$

(c)
$$\begin{array}{r} 81 \\ - 50 \\ \hline \end{array}$$

(d) $43 - 15$

(e)
$$\begin{array}{r} 67 \\ - 24 \\ \hline \end{array}$$

3. (a)
$$\begin{array}{r} 476 \\ + 909 \\ \hline \end{array}$$

(b) $324 + 406$

(c)
$$\begin{array}{r} 218 \\ + 547 \\ \hline \end{array}$$

(d) $296 + 318$

(e)
$$\begin{array}{r} 758 \\ + 825 \\ \hline \end{array}$$

4. (a)
$$\begin{array}{r} 723 \\ - 408 \\ \hline \end{array}$$

(b) $614 - 238$

(c)
$$\begin{array}{r} 407 \\ - 151 \\ \hline \end{array}$$

(d) $936 - 488$

(e)
$$\begin{array}{r} 512 \\ - 116 \\ \hline \end{array}$$

5. (a)
$$\begin{array}{r} 2563 \\ + 1920 \\ \hline \end{array}$$

(b) $3296 + 1930$

(c)
$$\begin{array}{r} 6105 \\ + 4819 \\ \hline \end{array}$$

(d) $5583 + 4214$

(e)
$$\begin{array}{r} 6295 \\ + 4099 \\ \hline \end{array}$$

6. (a)
$$\begin{array}{r} 6425 \\ - 3519 \\ \hline \end{array}$$

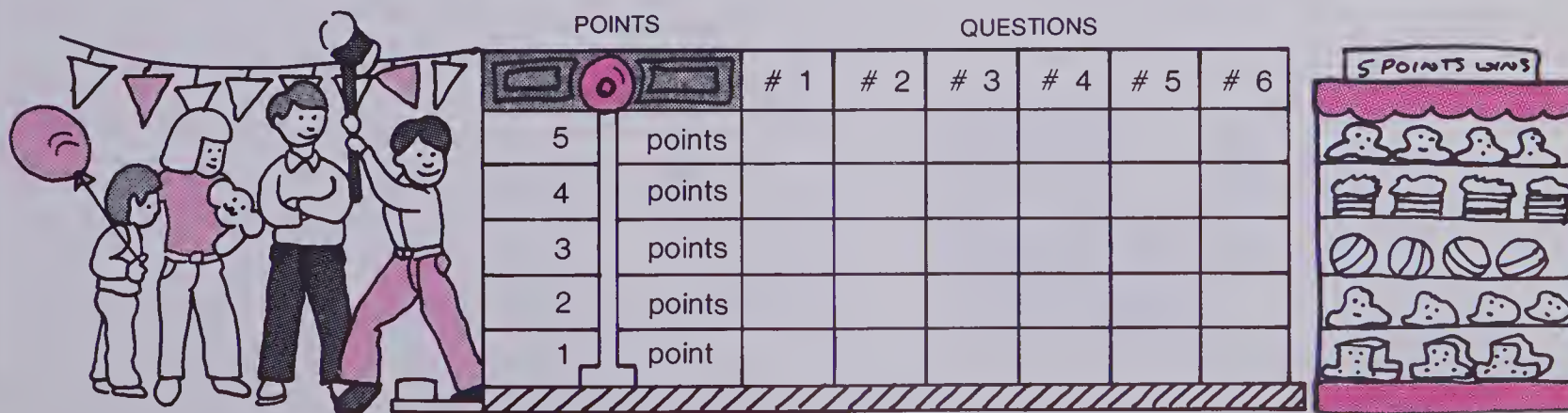
(b) $5705 - 2942$

(c)
$$\begin{array}{r} 8762 \\ - 4093 \\ \hline \end{array}$$

(d) $4930 - 1764$

(e)
$$\begin{array}{r} 8732 \\ - 1808 \\ \hline \end{array}$$

Each correct answer is worth 1 point. Graph your results.



Solving Problems

Brenda and Mary Ann collect pictures of horses.

Brenda has
21 pictures.







Mary Ann has
13 pictures.



How many more pictures does Brenda have than Mary Ann?

Step 1 Find answers to Professor Q's four questions.

Questions	Answers
	1. What is the main idea?
	2. What is being asked?
	3. What are the important facts?
	4. What operation(s) should be used?
	→ Pictures
	→ How many more pictures does Brenda have than Mary Ann?
	→ Brenda — 21 pictures, Mary Ann — 13 pictures
	→ Subtraction

Step 2 Write a number sentence to fit the problem.

$$21 - 13 = \blacksquare$$

Step 3 Make the sentence true.

$$21 - 13 = 8$$

Step 4 Write a statement.

Brenda has 8 more pictures than Mary Ann.

Exercises

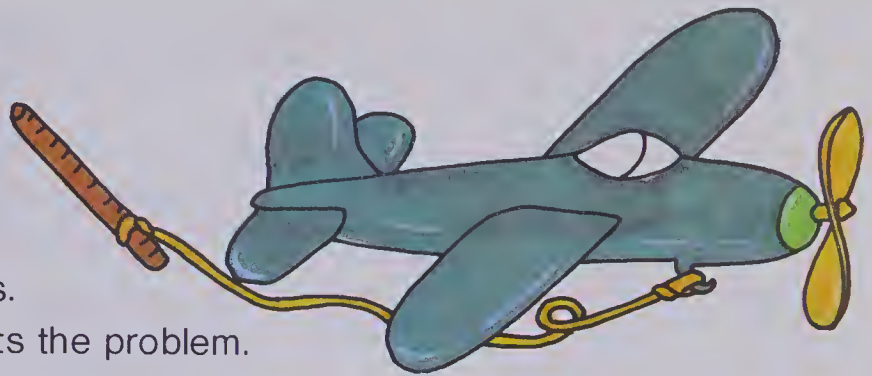
1. Bruce collects toy airplanes.

He had 17 airplanes.

He bought 5 more.

How many does he have now?

- (a) Answer Professor Q's four questions.
 (b) Choose the number sentence that fits the problem.
 (i) $17 - 5 = \blacksquare$ (ii) $\blacksquare + 5 = 17$ (iii) $17 + 5 = \blacksquare$
 (c) Make the sentence true.
 (d) Write a statement.



For each of the following:

- (a) Answer Professor Q's four questions *mentally*.
 (b) Write a number sentence to fit the problem.
 (c) Make the sentence true.
 (d) Write a statement.

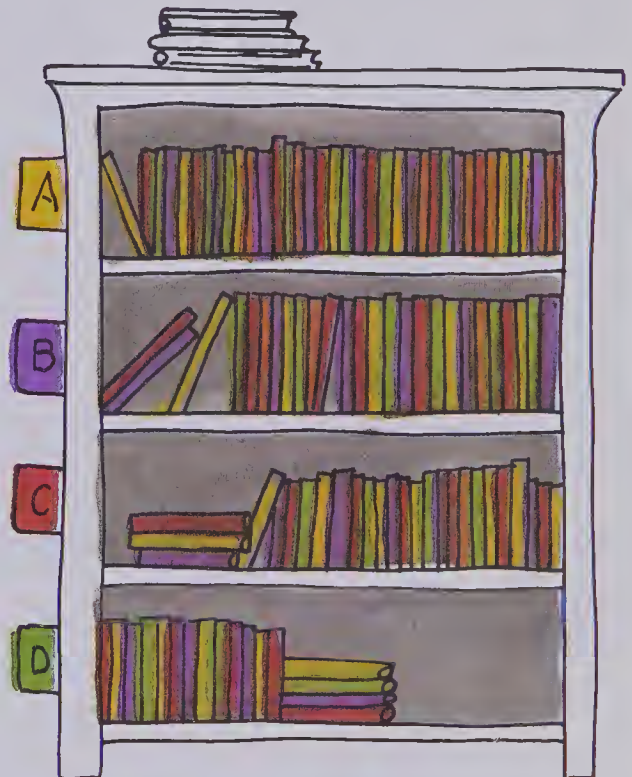
2. The school library has 37 books on the "A" shelf.
 There are 26 books on the "B" shelf.
 How many books altogether?

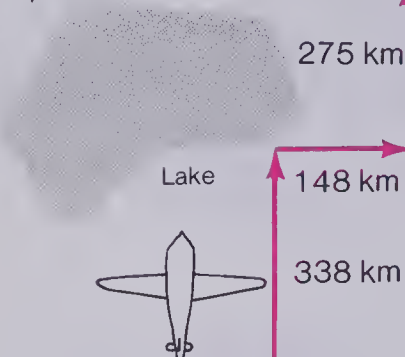
3. The Crestwick City Marching Band has 230 musicians.
 The Hartford Town Band has 168 musicians.
 How many musicians altogether?

4. The largest alphabet in the world has 74 letters.
 The English alphabet has 26 letters.
 How many more letters does the largest alphabet have than the English alphabet?

5. A filmstrip on "Birds" has 38 frames.
 A filmstrip on "Dogs" has 27 frames.
 How many frames altogether?

6. Kathleen has 81 coins in her coin collection.
 Patrick has 53 coins.
 How many more coins does Kathleen have than Patrick?





Search and Rescue

John is searching for a missing airplane.
He made this flight pattern.
338 km north
148 km east
275 km north



How many kilometres altogether?

(a) Add ones.

$$\begin{array}{r} 338 \\ 148 \\ + 275 \\ \hline \end{array}$$

(b) Add tens.

$$\begin{array}{r} 338 \\ 148 \\ + 275 \\ \hline \end{array}$$

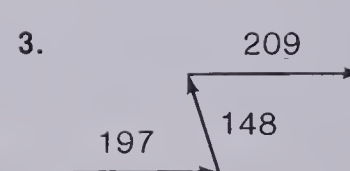
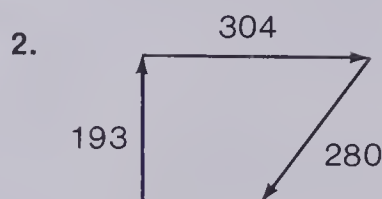
(c) Add hundreds.

$$\begin{array}{r} 338 \\ 148 \\ + 275 \\ \hline \end{array}$$

He flew 761 km altogether.

Exercises

Find how many kilometres in these flight patterns.



Add these flight patterns.

4.
$$\begin{array}{r} 327 \\ 232 \\ + 384 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 217 \\ 502 \\ + 175 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 520 \\ 119 \\ + 304 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 416 \\ 103 \\ + 231 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 283 \\ 357 \\ + 609 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 610 \\ 102 \\ + 547 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 318 \\ 407 \\ + 296 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 553 \\ 420 \\ + 619 \\ \hline \end{array}$$

Mountain



Forest



Lake



Rescue

John received this number code.
Break the code to find
the missing airplane!

Add. Match the letters with the answers below.
The first one is done for you!

$$\begin{array}{r} R \quad 26 \\ 37 \\ + 58 \\ \hline 121 \end{array}$$

$$\begin{array}{r} N \quad 106 \\ 23 \\ + 152 \\ \hline \end{array}$$

$$\begin{array}{r} T \quad 35 \\ 20 \\ 63 \\ + 18 \\ \hline \end{array}$$

$$\begin{array}{r} K \quad 309 \\ 146 \\ 250 \\ + 128 \\ \hline \end{array}$$

$$\begin{array}{r} B \quad 86 \\ 19 \\ + 24 \\ \hline \end{array}$$

$$\begin{array}{r} O \quad 115 \\ 27 \\ + 30 \\ \hline \end{array}$$

$$\begin{array}{r} H \quad 25 \\ 89 \\ 30 \\ + 42 \\ \hline \end{array}$$

$$\begin{array}{r} A \quad 5176 \\ 3810 \\ + 1162 \\ \hline \end{array}$$

$$\begin{array}{r} W \quad 65 \\ 32 \\ + 18 \\ \hline \end{array}$$

$$\begin{array}{r} M \quad 11\,631 \\ 30\,052 \\ 25\,812 \\ + 40\,418 \\ \hline \end{array}$$

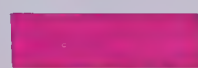
$$\begin{array}{r} I \quad 26 \\ 345 \\ + 63 \\ \hline \end{array}$$

$$\begin{array}{r} E \quad 29\,112 \\ 36\,853 \\ + 47\,384 \\ \hline \end{array}$$

$$\begin{array}{r} L \quad 58 \\ 47 \\ + 119 \\ \hline \end{array}$$

$$\begin{array}{r} D \quad 37 \\ 51 \\ + 42 \\ \hline \end{array}$$

$$\begin{array}{r} U \quad 7078 \\ 1422 \\ + 3253 \\ \hline \end{array}$$



R



115 113 349

10 148 121 113 349



129 113 349 136 115 113 349 113 349 281

136 186 113 349



107 913 172 11 753 281 136 10 148 434 281



10 148 281 130

224 10 148 833 113 349

The Freeble Factory

Tiffany made



35 freebles.

Ivan made



28 freebles.

Doug made



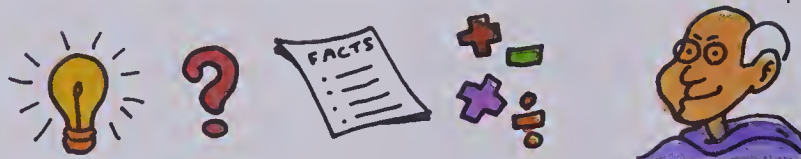
41 freebles.

How many freebles were made altogether?

$$\begin{array}{r} 35 \\ 28 \\ + 41 \\ \hline 104 \end{array}$$

Exercises

Solve these problems. Remember to answer Professor Q's four questions *mentally*.

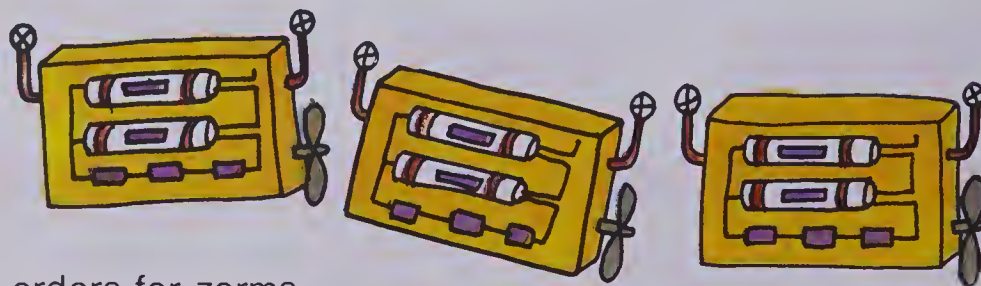


- There are 45 duffydoodles in the shop, 39 in the truck, and 50 on the loading dock. How many duffydoodles are there altogether?
- Carol packed 425 whatzits, Kathleen packed 398, and Sam packed 402. How many whatzits were packed altogether?

3.

Tribles	
Monday	56
Tuesday	42
Wednesday	39
Thursday	60
Friday	47

This chart shows how many tribles were made each day. How many tribles were made altogether?



- The factory has received these orders for zorms. How many zorms will they have to make altogether?

Please send
225 zorms.

Please send
360 zorms.

Please send
87 zorms.

Spin to Win

Make a spinner.



Rules

1. Spin twice.
2. Make a 2-digit number.
3. Add the number to your score.
(Score starts at 200.)
4. If one of the digits is a 4, *subtract* from your score.
5. Highest score after ten spins is the winner.



Copy and complete these two scorecards first. Who won?

	Score	
	Operation	200
Ron	1 + 53	253
	2 + 82	335
	3 - 34	301
	4 + 75	
	5 - 49	
	6	387
	7 + 91	
	8 + 66	544
	9 - 14	
	10 + 32	

	Score	
	Operation	200
Mary Ann	1 - 24	176
	2	245
	3 + 50	
	4 + 61	356
	5 - 47	
	6	361
	7 + 73	434
	8 - 04	
	9 + 82	512
	10 + 53	

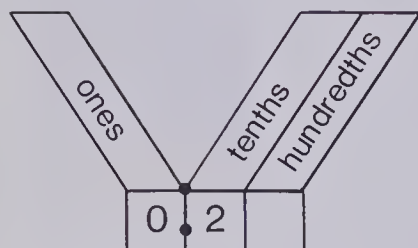
Make some scorecards. Play the game with a classmate. Check each other's scorecards.

Decimal Grids

$\frac{2}{10}$ shaded.

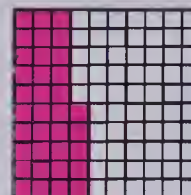


$\frac{2}{10}$ can be written as 0.2.

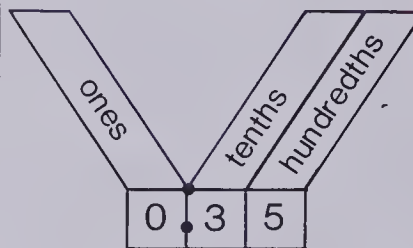


Read as
“zero decimal two”
or
“two tenths”.

$\frac{35}{100}$ shaded.



$\frac{35}{100}$ can be written as 0.35.

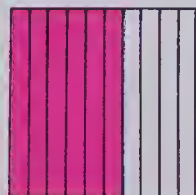


Read as
“zero decimal three five”
or
“thirty-five hundredths”.

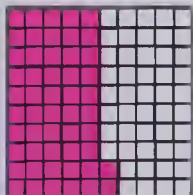
Exercises

Write a decimal to match the shading in each grid.

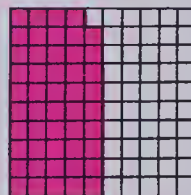
1.



2.



3.

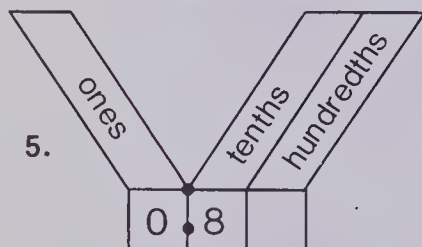


4.

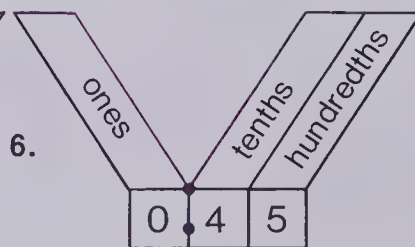


Read these decimals.

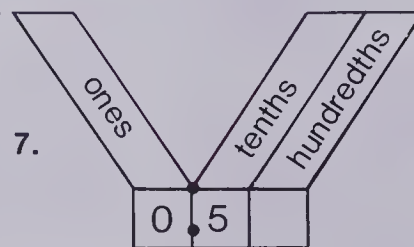
5.



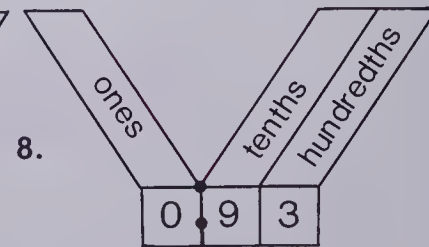
6.



7.



8.



Write each as a decimal.

9. zero decimal nine one

10. zero decimal seven

11. zero decimal three

12. zero decimal five

13. $\frac{4}{10}$

14. $\frac{26}{100}$

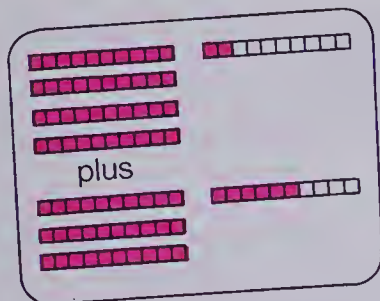
15. $\frac{9}{10}$

★ 16. $\frac{5}{100}$

★ 17. $\frac{50}{100}$

3 of a Kind

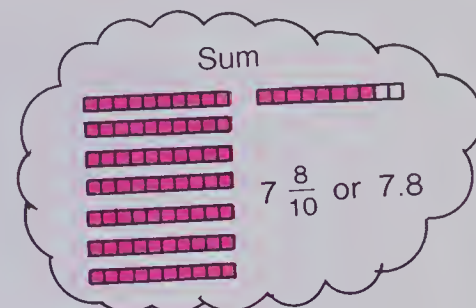
Irene has 3 cards that give the same sum.



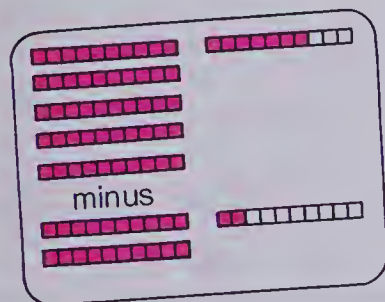
$$\begin{array}{r} 4 \frac{2}{10} \\ + 3 \frac{6}{10} \\ \hline 7 \frac{8}{10} \end{array}$$

$$4.2$$

$$\begin{array}{r} + 3.6 \\ \hline 7.8 \end{array}$$



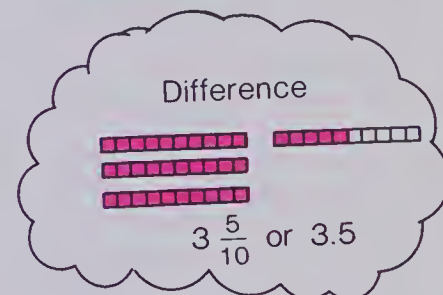
Terry has 3 cards that give the same difference.



$$\begin{array}{r} 5 \frac{7}{10} \\ - 2 \frac{2}{10} \\ \hline 3 \frac{5}{10} \end{array}$$

$$5.7$$

$$\begin{array}{r} - 2.2 \\ \hline 3.5 \end{array}$$



Exercises

Add.

1. $\begin{array}{r} 4.3 \\ + 2.4 \\ \hline \end{array}$

2. $\begin{array}{r} 3.5 \\ + 4.1 \\ \hline \end{array}$

3. $\begin{array}{r} 5.6 \\ + 3.3 \\ \hline \end{array}$

4. $\begin{array}{r} 2.6 \\ + 2.1 \\ \hline \end{array}$

5. $\begin{array}{r} 4.5 \\ + 2.3 \\ \hline \end{array}$

Subtract.

6. $\begin{array}{r} 7.5 \\ - 2.4 \\ \hline \end{array}$

7. $\begin{array}{r} 8.6 \\ - 4.5 \\ \hline \end{array}$

8. $\begin{array}{r} 5.5 \\ - 3.4 \\ \hline \end{array}$

9. $\begin{array}{r} 6.8 \\ - 5.2 \\ \hline \end{array}$

10. $\begin{array}{r} 7.9 \\ - 2.5 \\ \hline \end{array}$

Perform these operations.

11. $\begin{array}{r} 6.3 \\ + 2.8 \\ \hline \end{array}$

12. $\begin{array}{r} 7.2 \\ - 1.8 \\ \hline \end{array}$

13. $\begin{array}{r} 5.6 \\ + 2.5 \\ \hline \end{array}$

14. $\begin{array}{r} 6.1 \\ - 3.4 \\ \hline \end{array}$

15. $\begin{array}{r} 8.3 \\ - 5.5 \\ \hline \end{array}$

16. $\begin{array}{r} 6.8 \\ + 7.5 \\ \hline \end{array}$

17. $\begin{array}{r} 5.0 \\ - 2.6 \\ \hline \end{array}$

18. $\begin{array}{r} 8.0 \\ + 8.9 \\ \hline \end{array}$

19. $\begin{array}{r} 7.0 \\ - 5.6 \\ \hline \end{array}$

20. $\begin{array}{r} 9.3 \\ - 2.5 \\ \hline \end{array}$

Records and Tapes

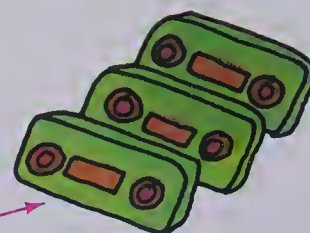


\$23.96

Stereo Record Album

The ROCK STARS
sing their latest hits!

Your choice
of
or



\$27.85

Cassette Tapes

Total cost of album and tapes.

$$\begin{array}{r} 111 \\ \$23.96 \\ + 27.85 \\ \hline \$51.81 \end{array}$$

Difference in price of album and tapes.

$$\begin{array}{r} 61715 \\ \$27.\cancel{85} \\ - 23.96 \\ \hline \$ 3.89 \end{array}$$

Exercises

Add.

$$\begin{array}{r} 1. \quad \$35.42 \\ + 18.65 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad \$37.04 \\ + 26.88 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad \$1.95 \\ + 4.25 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad \$235.49 \\ + 358.27 \\ \hline \end{array}$$

Subtract.

$$\begin{array}{r} 5. \quad \$84.29 \\ - 37.68 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad \$67.38 \\ - 34.89 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad \$6.95 \\ - 2.15 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad \$515.00 \\ - 327.19 \\ \hline \end{array}$$

Perform these operations.

$$\begin{array}{r} 9. \quad 31.05 \\ - 14.78 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 250.66 \\ + 417.85 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 86.29 \\ + 28.55 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 702.37 \\ - 217.01 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 90.75 \\ + 92.23 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 60.00 \\ - 20.74 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 526.00 \\ + 717.39 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 260.25 \\ - 193.07 \\ \hline \end{array}$$

Decimal Dilemma

Correct this decimal dilemma!

The human eye blinks
about 2500 times
each minute.

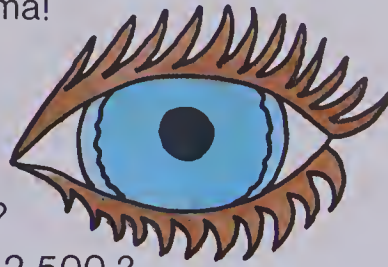
Which is more reasonable?

250.0 ?	25.00 ?	2.500 ?
(250)	(25)	(2.5)

too much

most reasonable

too little



Each of the following statements
is incorrect and unreasonable because
the decimal point is missing.

Correct each statement by placing
the decimal point in the proper
position.

The human eye blinks about 25 times each minute.

1. The Browns have a new baby girl. She has a mass of 46 kg.
3. The ceiling in the Bradford's new recreation room is 210 m from the floor.
5. The Harrisons drove for ten hours in their car to visit relatives. They covered 6000 km.
7. One of the highest weather temperatures recorded in the world is 5800°C.
9. Brad, an excellent runner, covered the one hundred metre run in 1350 s.
- ★ 11. Allan paid \$1.78 for his meal at Hamburger Haven. He gave the clerk a 5-dollar bill and received \$322 in change.
2. Katherine travelled twelve kilometres on her bike. The trip took her 125 h.
4. Tony measured the length of his middle finger. He said it was 62 cm long.
6. Gerald bought a new bicycle. He paid \$15899 for it.
8. The average can of pop contains 2840 mL of liquid.
10. The doctor said that Barbara was quite healthy. Her temperature was 370°C.
- ★ 12. Marcie needed four ribbons each 2.3 m long. The total length of ribbon needed was 920 cm.

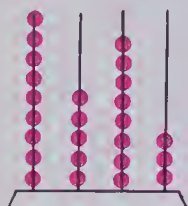
Place Value

One of the deepest holes drilled for a gas well was

9583 m.

Read as: "nine thousand, five hundred eighty-three".

Abacus



Place-value
chart

thousands	hundreds	tens	ones
9	5	8	3



Meaning: 9 thousands, 5 hundreds, 8 tens, 3 ones

Expanded form: $9000 + 500 + 80 + 3$

Exercises

Read these numerals.

1.

thousands	hundreds	tens	ones
4	7	2	5

2.

thousands	hundreds	tens	ones
3	0	6	2

3.

thousands	hundreds	tens	ones
8	3	0	7

4.

thousands	hundreds	tens	ones
5	2	8	0

Write numerals for each.

5. 3 thousands, 0 hundreds, 7 tens, 2 ones

6. 8 thousands, 4 hundreds, 5 tens, 0 ones

7. 7 thousands, 9 hundreds, 0 tens, 6 ones

8. 4 thousands, 8 hundreds, 3 tens, 1 one

9. $3000 + 200 + 50 + 6$

10. $9000 + 0 + 20 + 8$

11. $6000 + 400 + 0 + 7$

12. $5000 + 700 + 40 + 0$

13. six thousand, five hundred seventeen

14. two thousand, nine hundred, sixty-one

15. seven thousand, four

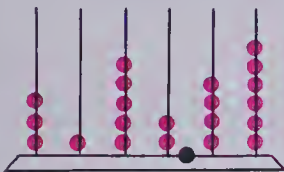
Place Value

The greatest distance travelled in a balloon was

3152.46 km.

Read as: “three thousand, one hundred fifty-two **decimal** four six”.

Abacus



Place-value chart

thousands	hundreds	tens	ones	tenths	hundredths
3	1	5	2	4	6



Meaning: 3 thousands, 1 hundred, 5 tens, 2 ones, 4 tenths, 6 hundredths

Expanded form: $3000 + 100 + 50 + 2 + 0.4 + 0.06$

Exercises

Read these numerals.

1.

thousands	hundreds	tens	ones	tenths	hundredths
7	2	0	5	4	6

2.

thousands	hundreds	tens	ones	tenths	hundredths
2	9	5	3	7	5

3.

thousands	hundreds	tens	ones	tenths	hundredths
3	0	9	2	5	1

Write numerals for each.

4. 2 thousands, 4 hundreds, 6 tens, 3 ones, 5 tenths, 8 hundredths

5. 6 thousands, 0 hundreds, 3 tens, 8 ones, 2 tenths, 5 hundredths

6. 8 thousands, 5 hundreds, 5 tens, 4 ones, 0 tenths, 6 hundredths

7. 5 thousands, 9 hundreds, 0 tens, 6 ones, 3 tenths, 4 hundredths

8. $4000 + 200 + 30 + 6 + 0.7 + 0.02$

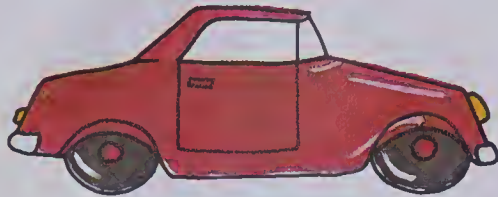
9. $6000 + 0 + 50 + 3 + 0.9 + 0.04$

10. $8000 + 400 + 0 + 5 + 0.2 + 0.03$

11. $5000 + 600 + 20 + 9 + 0 + 0.08$

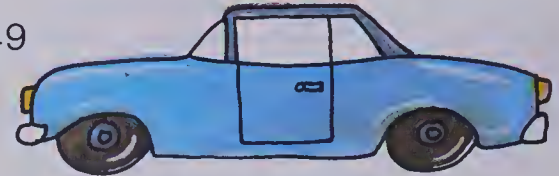
Car Auction

Mr. Ferguson buys used cars at the auction.



RALLY BLAZER
\$3485.99

EAGLE MARK IV
\$5568.49



What is the **total** cost of both cars?

$$\begin{array}{r} \text{Add.} \quad \$3485.99 \\ + \quad 5568.49 \\ \hline \$9054.48 \end{array}$$

The total cost is \$9054.48.

What is the **difference** in price?

$$\begin{array}{r} \$5568.49 \quad \text{Subtract.} \\ - 3485.99 \\ \hline \$2082.50 \end{array}$$

The difference in price is \$2082.50.

Exercises

Add.

$$\begin{array}{r} 1. \quad \$2753.55 \\ + 1248.99 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad \$3718.09 \\ + 5272.49 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad \$6172.80 \\ + 3086.45 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad \$1543.26 \\ + 6177.38 \\ \hline \end{array}$$

Subtract.

$$\begin{array}{r} 5. \quad \$7302.55 \\ - 3728.29 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad \$8394.57 \\ - 1648.92 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad \$9862.53 \\ - 5481.16 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad \$4300.61 \\ - 1648.75 \\ \hline \end{array}$$

Perform these operations.

$$\begin{array}{r} 9. \quad 5358.43 \\ + 2627.92 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 4681.25 \\ - 2814.75 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 6172.83 \\ + 3086.14 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 4552.60 \\ - 1373.40 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 3094.28 \\ + 1870.63 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 8062.15 \\ - 3140.75 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 5000.03 \\ + 2850.87 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 4064.33 \\ - 1688.52 \\ \hline \end{array}$$

Let's Compare

3524.06 and 3524.84

3 thousands	5 hundreds	2 tens	4 ones	D	0 tenths	6 hundredths
↙	↙	↙	↙	E	↙	
same	same	same	same	C	less	
↘	↘	↘	↘	I		
3 thousands	5 hundreds	2 tens	4 ones	M		
				A	8 tenths	4 hundredths
				L		

Remember!

< means "is less than".

> means "is greater than".

3524.06 < 3524.84

Exercises

Compare. Use =, <, or >.

1. 356 and 349

356
↑↑
349

356 • 349

2. 617 • 652

3. 4528 • 4522

4. 837 • 807

5. 2651 • 2651

6. 267.4 and 267.2

267.4
↑↑↑↑
267.2

267.4 • 267.2

7. 524.2 • 524.6

8. 4738.5 • 4738.2

9. 236.9 • 236.9

10. 8075.2 • 8074.8

11. 437.92 and 437.98

437.92
↑↑↑↑
437.98

437.92 • 437.98

12. 206.53 • 206.51

13. 8172.68 • 8172.68

14. 923.77 • 931.77

15. 3219.03 • 3219.51

★ 16. 454.5 • 455.4

★ 17. 4407.12 • 4407.21

★ 18. 505.1 • 505.12

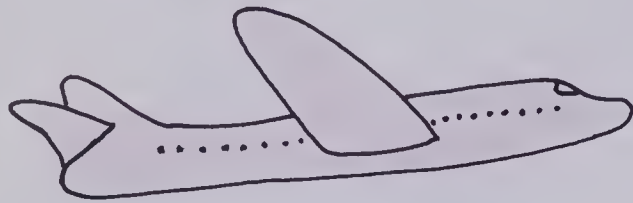
★ 19. 3333 • 333.3

20. Place these decimals in order from smallest to largest.

55.39 553.9 55.49 554.9 55.5

Airplanes

Smoothflight 301



28.62 m

28.34 m

11.31 m

830 km/h

10 670 m

2350 km

90

Length

Wing Span

Height

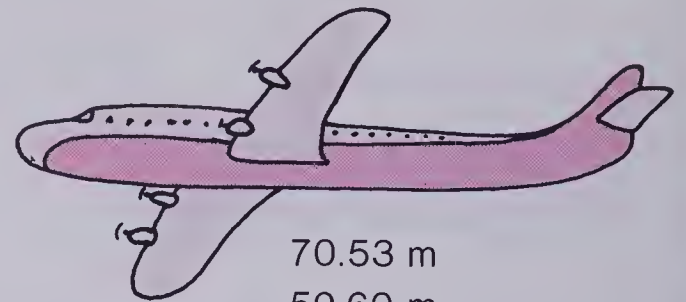
Cruising Speed

Maximum Altitude

Maximum Range

Seating Capacity

Stratosphere 747



70.53 m

59.60 m

19.31 m

914 km/h

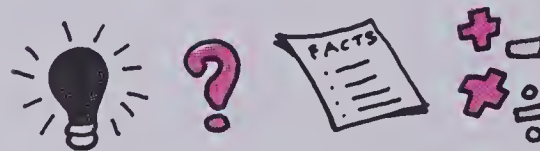
13 722 m

10 200 km

361

Exercises

Remember Professor Q's four questions.



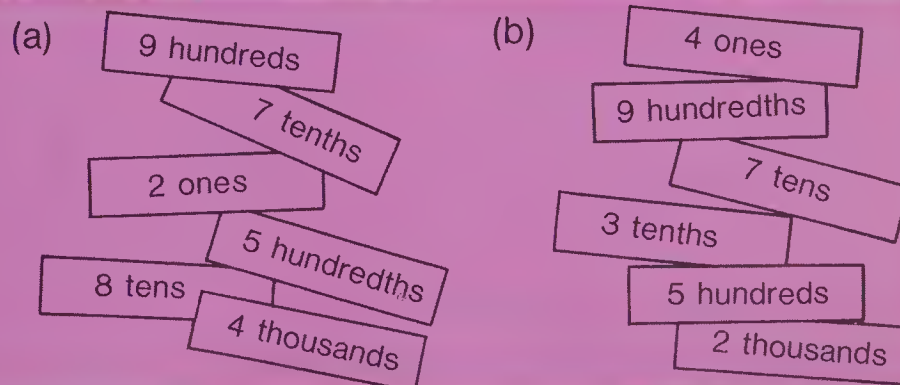
1. The Smoothflight 301 is parked behind a Stratosphere 747 in the hangar.
How long must the hangar be?
2. How much higher can the 747 fly than the 301?
3. Which plane holds more passengers, the Stratosphere 747 or the Smoothflight 301?
How many more?
4. Pilot Sam Stevens flew 5218 km, then he flew 2045 km.
How many kilometres did he fly altogether?
5. There are 259 passengers on the Stratosphere 747.
How many empty seats are there?

Some problems have 2 or more parts.
Read each problem carefully.

6. The distance from Montreal to Honolulu is 7917 km.
How many kilometres more is this distance than the maximum range of the Smoothflight?
How many kilometres less is this distance than the maximum range of the Stratosphere?
7. The Smoothflight and Stratosphere are parked side by side.
What is their total width?
Will they fit side by side in a hangar that is 95.3 m wide?
8. Mount Everest is 8840 m high.
How much higher can the Smoothflight fly?
How much higher can the Stratosphere fly?
9. As a safety check, test pilot Craig Roberts flew the Smoothflight to its maximum range.
Then he flew the Stratosphere to its maximum range.
How many kilometres did he fly altogether?
10. The hangar door at Montgomery Airport is 15.82 m high.
Which plane would fit through the door?
How much higher is the door than the plane?
- ★ 11. There were 326 passengers on the Stratosphere 747 when it left Vancouver Airport.
At Calgary, 159 passengers got off.
At Regina, 78 passengers got on.
How many passengers were on the plane when it left Regina?
How many empty seats were there?

BRAINTICKLER

Put these blocks in the right order,
then write the numeral.

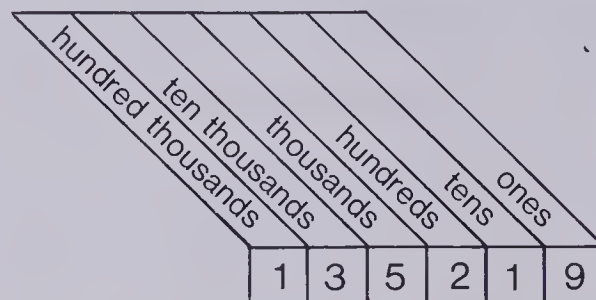


Telephones

In 1976 the city of Halifax had 135 219 telephones.

Read and write as: "one hundred thirty-five thousand, two hundred nineteen".

Place-value chart:



Meaning: 1 hundred thousand, 3 ten thousands, 5 thousands, 2 hundreds, 1 ten, 9 ones

Expanded form: $100\ 000 + 30\ 000 + 5\ 000 + 200 + 10 + 9$

Exercises

1. Use the chart.

City	Number of Telephones	
Calgary	352 967	Read these numbers.
Edmonton	329 239	
Hamilton	199 119	
Kitchener	109 654	
London	165 435	Write these on a place-value chart.
Ottawa	417 377	
Quebec City	252 835	
Regina	105 655	
Vancouver	417 372	Write these in expanded form, then in words.
Victoria	130 049	
Windsor	118 820	
Winnipeg	372 822	

2. Which city in the list has the

(a) greatest number of telephones?

(b) fewest number of telephones?

More Telephones

Calgary has 352 967 telephones.

Vancouver has 417 372 telephones.

How many telephones altogether?



$$\begin{array}{r} \text{Add.} \quad 352\,967 \\ +417\,372 \\ \hline 770\,339 \end{array}$$

Ottawa has 417 377 telephones.

Hamilton has 199 119 telephones.

How many more telephones in Ottawa?



$$\begin{array}{r} \text{Subtract.} \quad 417\,377 \\ -199\,119 \\ \hline 218\,258 \end{array}$$



Exercises

Add.

1.
$$\begin{array}{r} 424\,155 \\ +319\,268 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 337\,183 \\ +164\,772 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 517\,687 \\ +172\,833 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 209\,495 \\ +427\,812 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 436\,611 \\ +352\,967 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 100\,539 \\ +314\,924 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 226\,653 \\ +705\,465 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 340\,908 \\ +186\,529 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 191\,982 \\ +245\,438 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 470\,791 \\ +133\,221 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 112\,492 \\ +759\,066 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 523\,407 \\ +280\,817 \\ \hline \end{array}$$

Subtract.

13.
$$\begin{array}{r} 388\,622 \\ -109\,357 \\ \hline \end{array}$$

14.
$$\begin{array}{r} 333\,412 \\ -198\,802 \\ \hline \end{array}$$

15.
$$\begin{array}{r} 654\,006 \\ -187\,417 \\ \hline \end{array}$$

16.
$$\begin{array}{r} 407\,214 \\ -148\,506 \\ \hline \end{array}$$

17.
$$\begin{array}{r} 500\,073 \\ -296\,523 \\ \hline \end{array}$$

18.
$$\begin{array}{r} 871\,046 \\ -328\,528 \\ \hline \end{array}$$

19.
$$\begin{array}{r} 622\,471 \\ -301\,851 \\ \hline \end{array}$$

20.
$$\begin{array}{r} 533\,281 \\ -217\,904 \\ \hline \end{array}$$

21.
$$\begin{array}{r} 716\,075 \\ -342\,829 \\ \hline \end{array}$$

22.
$$\begin{array}{r} 365\,681 \\ -118\,454 \\ \hline \end{array}$$

23.
$$\begin{array}{r} 500\,003 \\ -125\,417 \\ \hline \end{array}$$

24.
$$\begin{array}{r} 624\,118 \\ -261\,573 \\ \hline \end{array}$$

Population



Read and write as: “twenty-two million, nine hundred ninety-eight thousand”.

Place-value chart:

hundred millions	ten millions	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones
	2	2	9	9	8	0	0	0

Population of Canada
22 998 000

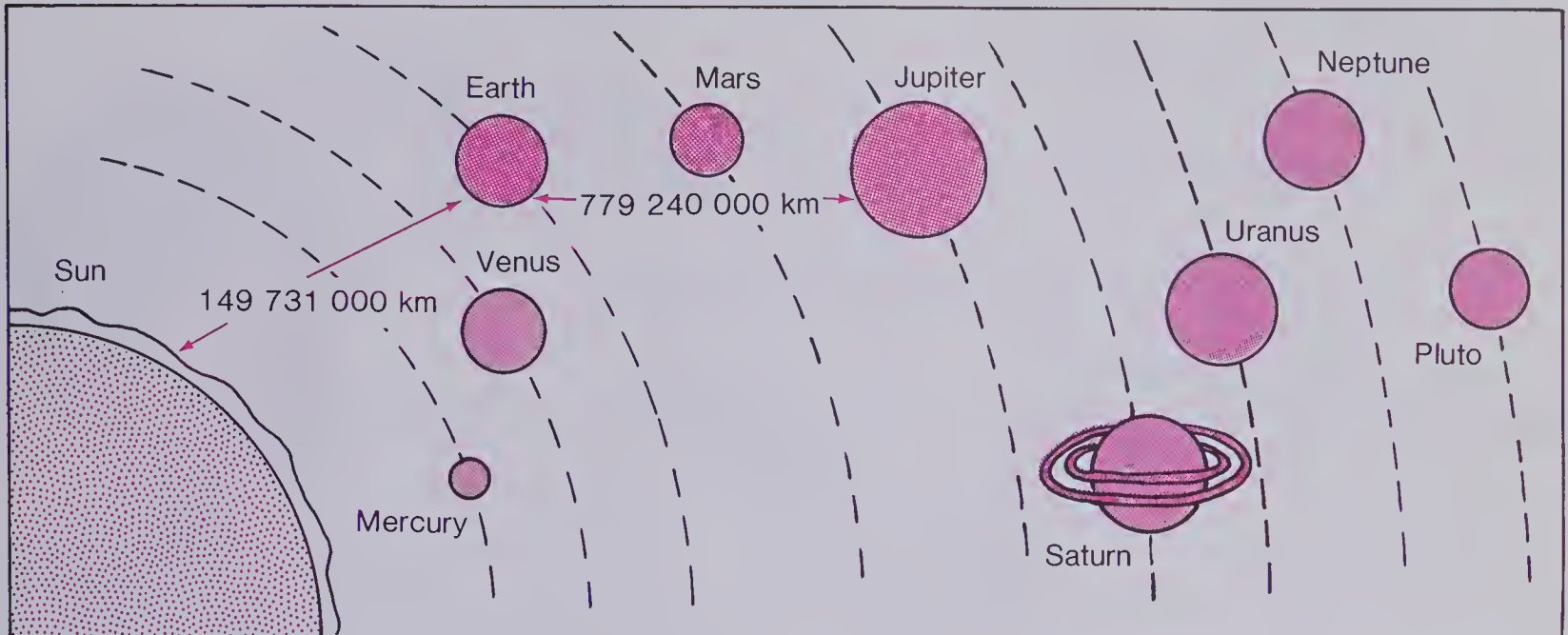
Meaning: 2 ten millions, 2 millions, 9 hundred thousands,
9 ten thousands, 8 thousands, 0 hundreds, 0 tens,
0 ones

1. Alberta	1 804 000	7. Nova Scotia	830 000
2. British Columbia	2 481 000	8. Ontario	8 290 000
3. Manitoba	1 023 000	9. Prince Edward Island	120 000
4. New Brunswick	684 000	10. Quebec	6 224 000
5. Newfoundland	554 000	11. Saskatchewan	929 000
6. Northwest Territories	40 000	12. Yukon Territory	19 000

Exercises

- List those provinces and territories with populations
(a) less than one million (b) more than one million.
- Read the populations of the first eight provinces and territories in the list.
- Write the populations of the last four provinces and territories in the list using expanded form.
- Write in order from least to greatest the populations of Newfoundland, Prince Edward Island, Saskatchewan, Nova Scotia, and New Brunswick.

Solar Facts



John discovered some facts about the solar system while in the library.

Give the meaning of each underlined digit.

Read each number first.

- Mars is about 55 706 000 km from Earth.
(a) 5 means 5 millions. (b) 6 means ■.
- Earth is about 149 731 000 km from the sun.
- Jupiter has a diameter of 142 807 km.
- It takes Pluto about 266 820 h to make one revolution around the sun.
- Venus is about 41 860 000 km from Earth.
- Mercury is about 57 960 000 km from the sun.
- The diameter of Saturn including the rings is 185 762 km.
- It would take about 1 787 040 min for a spaceship to travel from Earth to Saturn.
- Jupiter is about 779 240 000 km from Earth.

Thousandths

Consider the number 46.352.

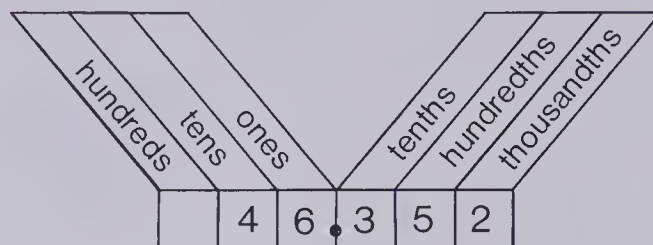
Read as: “forty-six decimal three five two”

or

“forty-six and three hundred fifty-two thousandths”.

46.352

Place-value chart:



Meaning: 4 tens, 6 ones, 3 tenths, 5 hundredths, 2 thousandths

Expanded form: $40 + 6 + 0.3 + 0.05 + 0.002$



Exercises

Read these numbers.

1. 0.001
2. 14.024
3. 85.006
4. 36.029
5. 68.124

Draw a place-value chart and place each number on the chart.

6. 16.043
7. 75.307
8. 12.754
9. 50.197
10. 63.002

Write the meaning.

11. 46.352
12. 60.483
13. 18.046
14. 37.509
15. 71.008

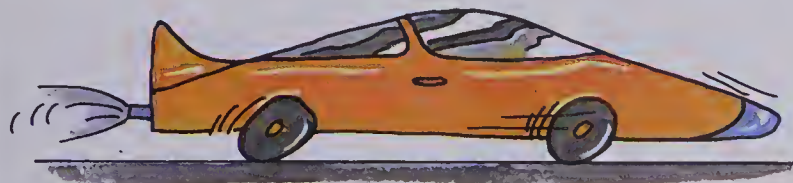
Write in expanded form.

16. 26.013
17. 39.005
18. 40.172
19. 83.505
20. 61.541

Write the value of each underlined digit.

21. 37.924
22. 43.275
23. 80.471
24. 29.606
25. 72.093

Fascinating Facts!



The "Jet Car" covered
1 km in 3.542 s.

Meaning:

3 ones, 5 tenths, 4 hundredths,
2 thousandths

Place-value
chart:

Read:

"one million, two hundred
fifty-six thousand, three
hundred forty-seven".

hundred millions	ten millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones	tenths	hundredths	thousandths	
		1	2	5	6	3	4	3	5	4	2
								7			



An earthworm would cover
the same distance in
1 256 347 s.

Meaning:

1 million, 2 hundred
thousands, 5 ten thousands,
6 thousands, 3 hundreds,
4 tens, 7 ones

Read:

"three decimal five four two"

or

"three and five hundred
forty-two thousandths".

Exercises

Use one of the forms to express each of the following numbers.

1. Your heart will beat about 1 620 000 times in fifteen days.
2. A sheet of paper is about 0.05 mm thick.
3. The oldest moon rocks brought back by the Apollo crew are about 4 720 000 a (years) old.
4. The shortest millipede is about 0.023 cm long.
5. The "Beatles" rock group sold about 545 000 000 records.
6. The earth travels around the sun at a rate of 107 290.4 km/h.

Pharmacist

1. The pharmacist counted 780 cold tablets in one container and 495 in another.
How many cold tablets are there altogether?
2. The pharmacist filled two prescriptions for Mrs. Finley.
One cost \$18.95; the other cost \$12.49.
What was the total cost?
3. Green pills cost \$12.25 a bottle.
Red pills cost \$8.69 a bottle.
How much more do the green pills cost?
4. There were 3756 tubes of toothpaste sold the first year that the drugstore was open.
During the second year, 4654 tubes were sold. There were 2065 tubes sold in the third year and 4507 tubes sold during the fourth year.
How many tubes of toothpaste were sold during the four years?
5. The pharmacist ordered some bottles of baby oil for \$127.60, some tins of baby powder for \$118.90, and some baby food for \$358.28.
What was the total cost?
6. A display holds 320 boxes of "Super Stick" band aids.
There were 176 boxes sold.
One box costs \$1.19.
How many boxes are left in the display?
- ★ 7. The "Home 'n Car" first aid kit cost \$41.35 last week.
It is now on sale for \$25.99.
There are only 12 kits on the shelf.
What is the difference in price?



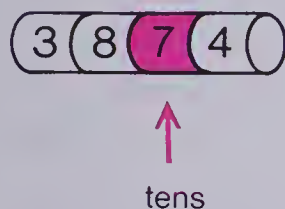
Rounding Rollers

Murray wants to round 3874 to the nearest ten.

Here's how he does it!

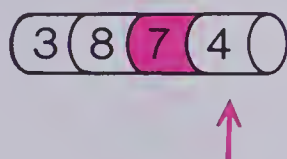
Step 1

He finds the ten's digit.



Step 2

Murray finds the next digit to the right.



Step 3

If the digit on the right is 5 or greater, he rounds up. If it is 4 or less, the original digit remains the same.



Why did Murray leave the digit "7" unchanged?

3874 rounds to 3870.

Exercises

Round to the nearest *ten*.

1. $\begin{array}{|c|c|c|c|} \hline 2 & 5 & 3 & 6 \\ \hline \end{array}$ rounds to $\begin{array}{|c|c|c|c|} \hline 2 & 5 & 4 & 0 \\ \hline \end{array}$ 2. 4781

3. 8935

4. 5652

5. 7138

6. 4367

7. 2682

8. 3341

Round to the nearest *hundred*.

9. $\begin{array}{|c|c|c|c|} \hline 3 & 7 & 2 & 1 \\ \hline \end{array}$ rounds to $\begin{array}{|c|c|c|c|} \hline 3 & 7 & 0 & 0 \\ \hline \end{array}$ 10. 6792

11. 1375

12. 2813

13. 7214

14. 5932

15. 4157

16. 3313

Round to the nearest *thousand*.

17. $\begin{array}{|c|c|c|c|} \hline 3 & 7 & 2 & 8 \\ \hline \end{array}$ rounds to $\begin{array}{|c|c|c|c|} \hline 4 & 0 & 0 & 0 \\ \hline \end{array}$ 18. 5861

19. 4178

20. 8215

21. 6549

22. 3177

23. 5462

24. 7945

More Rounding Rollers

Brenda wants to round 25.368 to the nearest tenth. She uses 3 steps also!

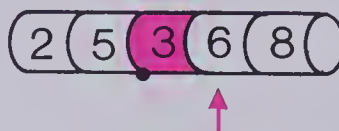
Step 1

She finds the tenth's digit.



Step 2

She finds the next digit to the right.



Step 3

If that digit on the right is 5 or greater, she rounds up. If it is 4 or less, the original digit remains the same.



Why did Brenda round up?

25.368 rounds to 25.4.

Exercises

1. Round to the nearest tenth.

(a) 18.279

(b) 3.24

(c) 7.683

(d) 96.15

(e) 56.71

2. Round to the nearest hundredth.

(a) 8.173

(b) 5.238

(c) 16.375

(d) 4.981

Step 1

18.279
↑
3.24
↑

Step 2

18.279
↑ ↑
3.24
↑ ↑

Step 3

18.3
3. ■

Step 1

8.173
↑
5.238
↑

Step 2

8.173
↑ ↑
5.238
↑ ↑

Step 3

8.17
5.2 ■

Use the 3 steps to round to the nearest whole number.

3. 72.617 → 72.617 → 72.617 → 73

4. 63.246

5. 27.6

6. 548.1

7. 64.271

8. 561.8

9. 6.5

10. 40.23

People and Provinces

Population of Certain Canadian Provinces.

Ontario	8 290 145
Quebec	6 224 214
British Columbia	2 481 231
Alberta	1 803 681
Manitoba	1 022 938
Saskatchewan	929 090
Newfoundland	554 497
Prince Edward Island	120 048

Round to the nearest million to estimate the combined population of Ontario and Saskatchewan.

8 290 145 \longrightarrow 8 000 000

929 090 \longrightarrow 1 000 000

Estimated sum is 9 000 000.

Remember!

Use the

"three steps".

Exercises

Round to the nearest million to estimate the combined population of:

- Quebec and Ontario
- British Columbia and Alberta
- Manitoba and Saskatchewan
- Alberta and Newfoundland
- 4 western provinces
- 3 provinces with largest populations
- Prince Edward Island and Saskatchewan
- Newfoundland and Prince Edward Island.

Round to the nearest million to estimate the differences in population.

- Ontario and Quebec
- British Columbia and Alberta
- Alberta and Saskatchewan
- Manitoba and Saskatchewan
- Newfoundland and Prince Edward Island
- Manitoba and Newfoundland

Round to the nearest hundred thousand to better estimate the differences in the population of:

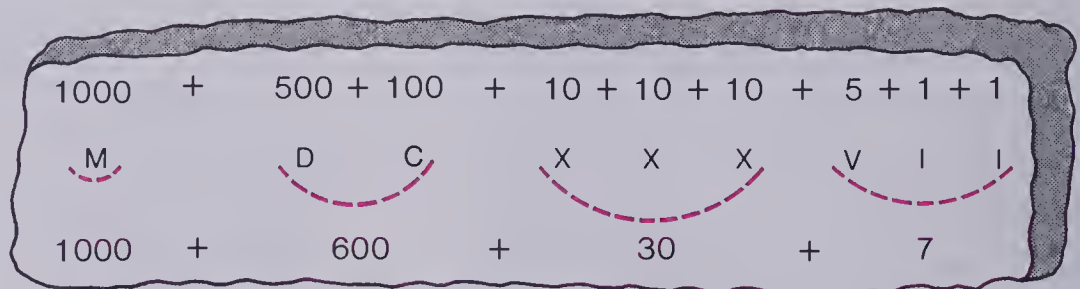
- Manitoba and Saskatchewan
- British Columbia and Alberta
- Manitoba and Newfoundland
- Saskatchewan and Newfoundland
- Newfoundland and Prince Edward Island
- Manitoba and Alberta.
- Round the population of each province to
 - the nearest ten thousand
 - the nearest thousand.

Roman Numerals

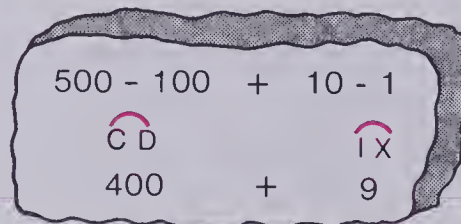
Roman Numerals	I	V	X	L	C	D	M
Our Numerals	1	5	10	50	100	500	1000

The Roman system uses addition and subtraction to form numbers.

1637
MDCXXXVII



409
CDIX



Exercises

Write our numerals.

1. XXIII
2. XVI
3. LII
4. CLIII
5. DCXXXV
6. LXV
7. DCC
8. CLXX
9. DXXVIII
10. MDCXXIII

Subtraction is used for special cases. Complete these special cases.

11. IV 5 - 1 or 4
12. XL 50 - 10 or ■
13. CD 500 - 100 or ■

14. IX 10 - 1 or 9
15. XC 100 - 10 or ■
16. CM 1000 - 100 or ■

Write our numerals. (\frown means subtract.)

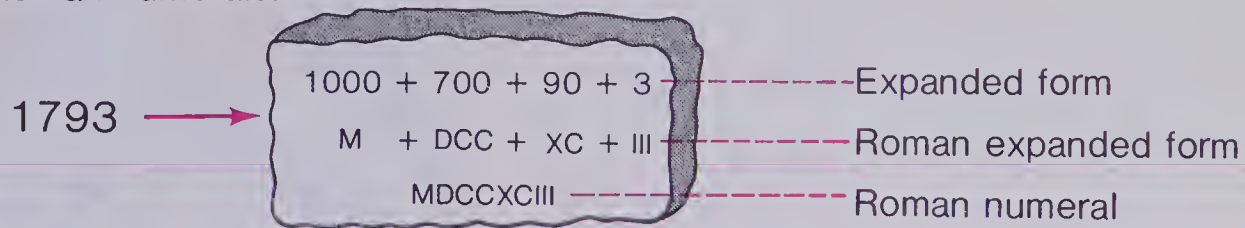
17. \frown XLVI
18. \frown XCII
19. \frown XIV
20. \frown CD \frown XLVIII
21. \frown CMXXX \frown IV

Write our numerals.

22. XIII
23. LXXXVIII
24. CMIX
25. LXVI
26. CCLXXVII

Writing Roman Numerals

Write 1793 in Roman numerals.



Exercises

Write Roman numerals for:

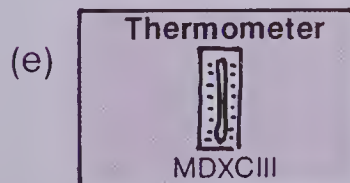
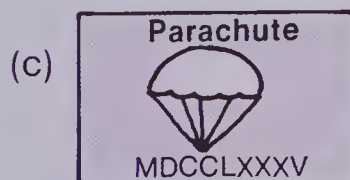
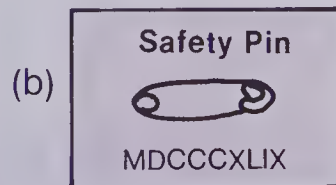
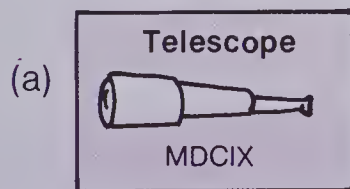
1. the numbers 1 to 20.
2. the numbers 10 to 100 (by tens).
3. the numbers 100 to 1000 (by hundreds).

Write Roman numerals.

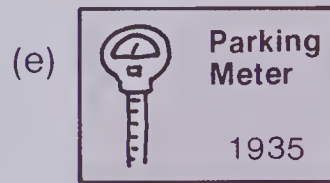
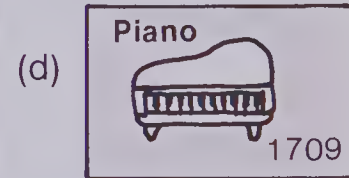
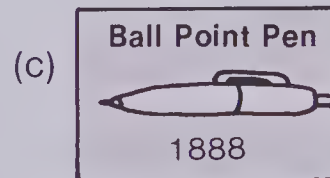
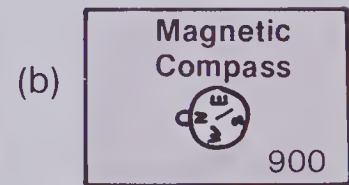
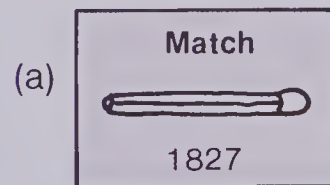
- | | | | |
|---------|---------|---------|---------|
| 4. 1975 | 5. 2694 | 6. 1849 | 7. 999 |
| 8. 259 | 9. 473 | 10. 551 | 11. 844 |

INVENTIONS

12. Write in our numerals.



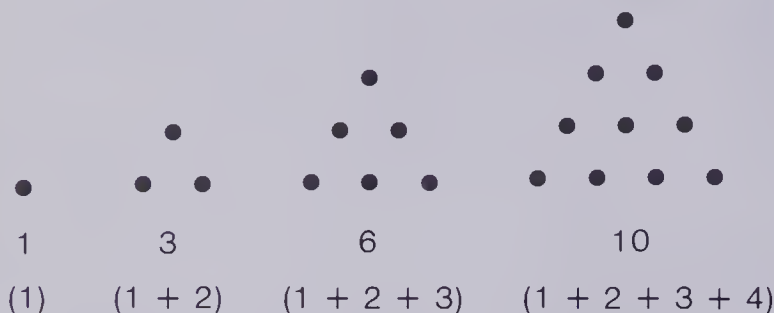
13. Write in Roman numerals.



Geometric Numbers

Sometimes we can relate geometric shapes and numbers.

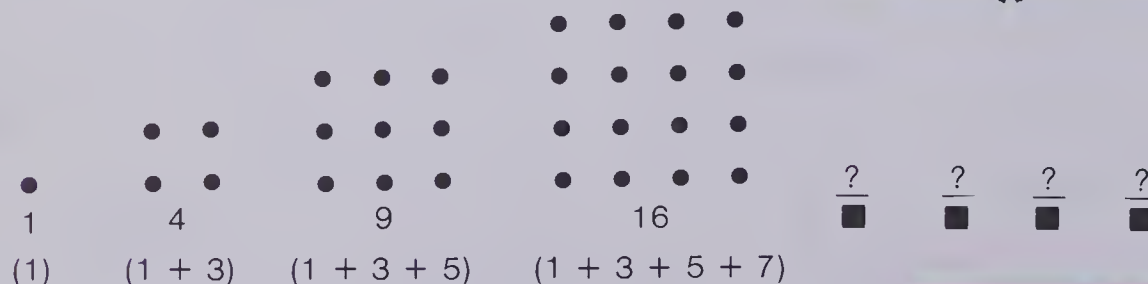
1. Here are the first four **triangular numbers**.



Use the pictures and number patterns to find the next four *triangular numbers*.

(Do you see other patterns that will help?)

2. Here are the first four **square numbers**.

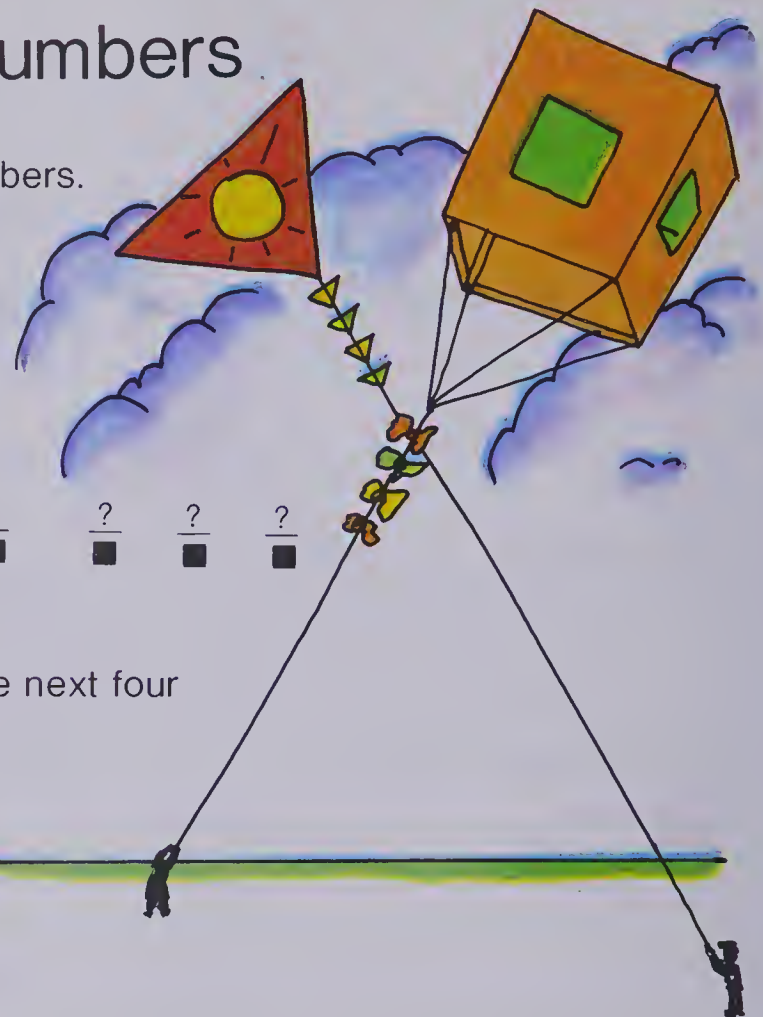


Use the pictures and number patterns to find the next four *square numbers*.

(Do you see other patterns that will help you?)

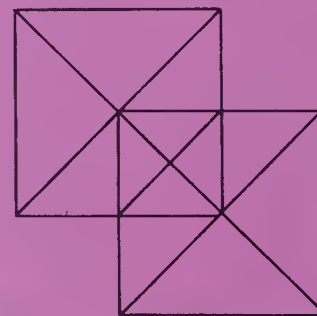
★ 3. Which of the following are *triangular numbers*?
66, 75, 91, 120, 134

★ 4. Which of the following are *square numbers*?
100, 121, 222, 289, 82



BRAINTICKLER

How many triangles?

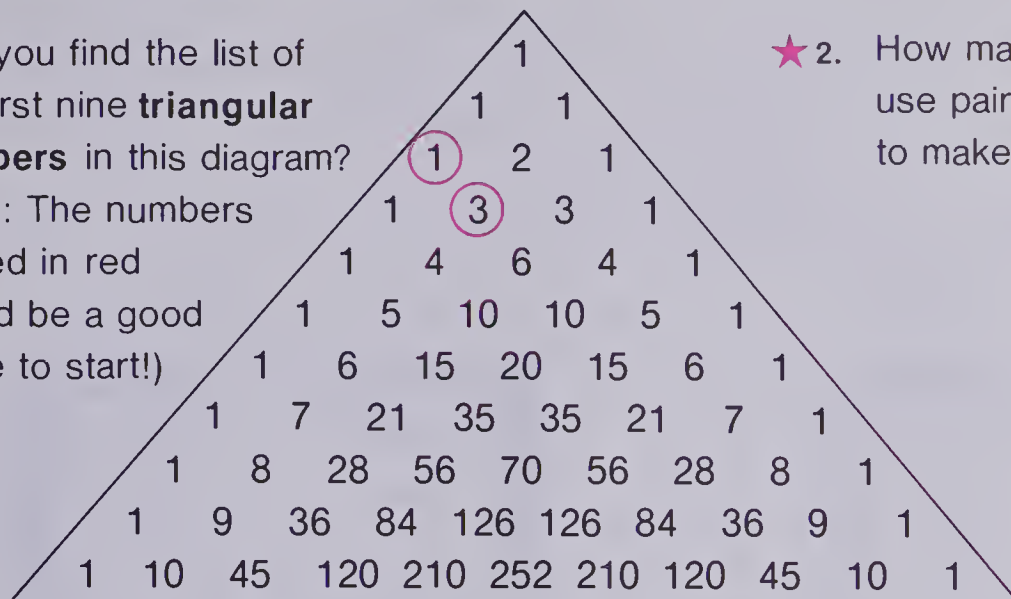


Pascal's Triangle

Pascal's Triangle contains many patterns.

1. Can you find the list of the first nine **triangular numbers** in this diagram?

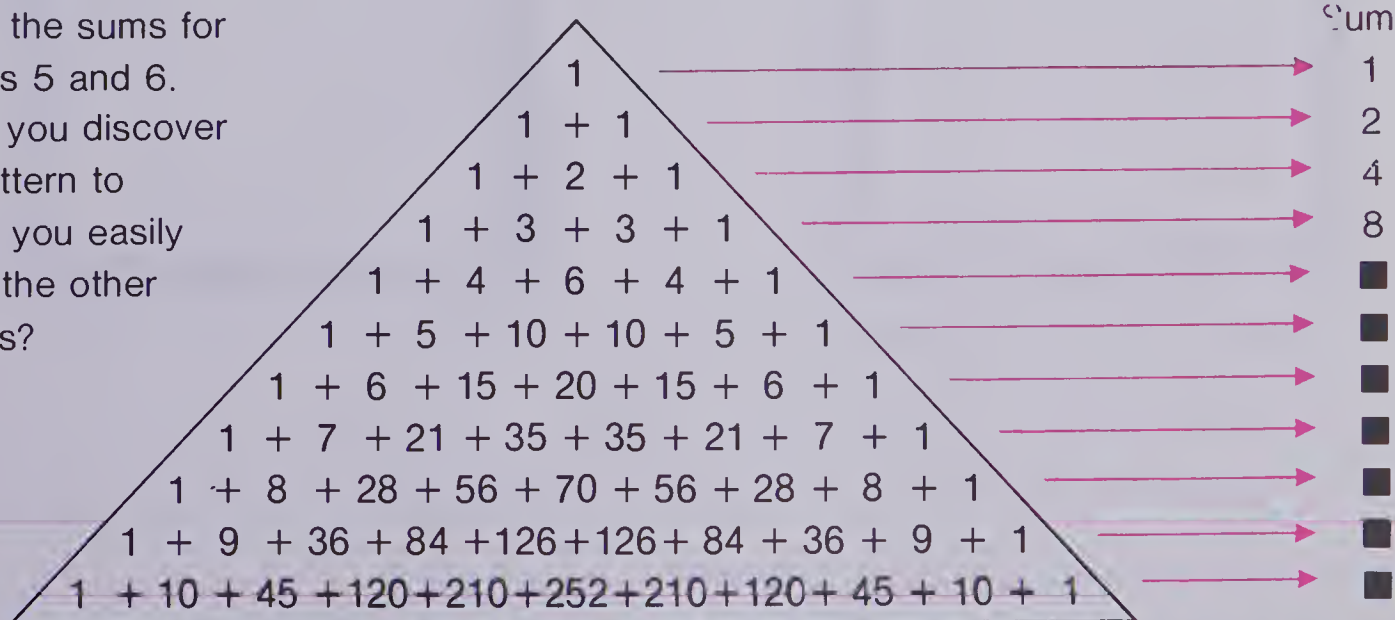
(Clue: The numbers circled in red would be a good place to start!)



- ★ 2. How many ways can you use pairs of numbers to make **square numbers**?

CHALLENGE: Can you discover the pattern Pascal might have used to make his triangle? Clue: **THINK addition!**

3. Find the sums for Rows 5 and 6. Can you discover a pattern to help you easily find the other sums?



Canadian Road Test



The Gord Motor Company tested a new model car by driving it across Canada. Each number shows a part of the total trip.

A

Sections	Kilometres
Vancouver	438
to	525
Edmonton	392
Edmonton	465
to	335
Regina	
Regina	285
to	286
Winnipeg	
Winnipeg	346
to	620
Toronto	539
	604

B

C

D

E

F

G

H

Sections	Kilometres
Toronto	187
to	212
Ottawa	
Ottawa	274
to	167
Quebec City	
Quebec City	316
to	195
Moncton	284
Moncton	105
to	157
Halifax	

- Find the total distance for *each* section.
- Find the total distance from Vancouver to Halifax.
- Which section is the shortest? Which section is the longest?
- How much greater is the distance covered
 - in Section **A** than Section **G**?
 - in Section **B** than Section **E**?

Chapter Test

1. Complete the table.

Rule: ?	
Enter	Display
14	23
2	11
25	34
17	<input type="text"/>
8	<input type="text"/>
10	<input type="text"/>

The rule is _____.

2. Round 4763.754 to the nearest:

- (a) hundredth (b) tenth (c) one
(d) ten (e) hundred (f) thousand

3. Write as decimals.

- (a) zero decimal five three (b) $\frac{8}{10}$
(c) $\frac{53}{100}$ (d) $\frac{99}{100}$

4. Write in expanded form.

- (a) 531 633 (b) 228 190 (c) 22 000

5. Write numerals for each.

- (a) two hundred forty-six thousand, five hundred nineteen
(b) $70\ 000 + 3000 + 500 + 20 + 4 + 0.8 + 0.09$
(c) twenty-one million, four hundred thousand
(d) 5 tens, 2 ones, 6 tenths, 4 hundredths, 7 thousandths

6. Add.

- (a)
$$\begin{array}{r} 283 \\ 409 \\ +287 \\ \hline \end{array}$$
 (b)
$$\begin{array}{r} 13\ 216 \\ 180 \\ 22\ 406 \\ + \quad 73 \\ \hline \end{array}$$
 (c)
$$\begin{array}{r} 702.44 \\ +368.09 \\ \hline \end{array}$$
 (d)
$$\begin{array}{r} 4172.83 \\ +3608.42 \\ \hline \end{array}$$

7. Subtract.

- (a)
$$\begin{array}{r} 625 \\ -278 \\ \hline \end{array}$$
 (b)
$$\begin{array}{r} 4030 \\ -1574 \\ \hline \end{array}$$
 (c)
$$\begin{array}{r} 702.43 \\ -317.05 \\ \hline \end{array}$$
 (d)
$$\begin{array}{r} 5624.00 \\ -1781.42 \\ \hline \end{array}$$

8. Compare. Use $<$, $>$, or $=$.

- (a) $246 \bullet 358$ (b) $4627.8 \bullet 4627.5$ (c) $327.94 \bullet 327.91$

9. Write in our numerals:

- (a) xxiv (b) MDCXIV (c) CD

10. Write in Roman numerals:

- (a) 54 (b) 615 (c) 1982

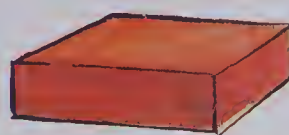
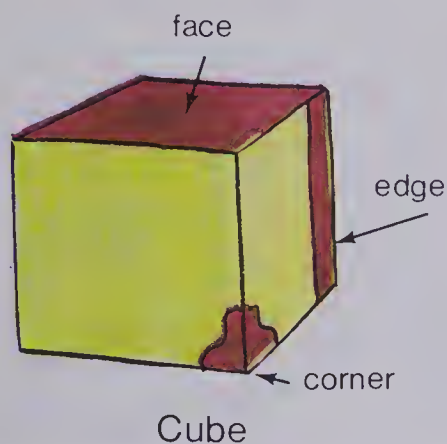
Chapter 2

Geometry

Shapes and Angles



Shapes and Their Faces

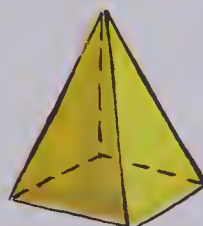


rectangular

Prisms



triangular

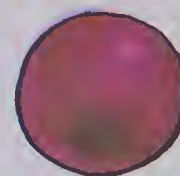


square base

Pyramids



triangular base



Sphere



Cone

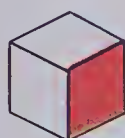
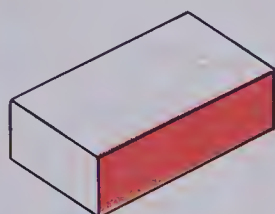
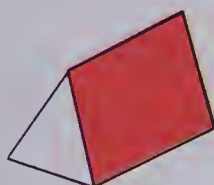


Cylinder

Exercises

Name the shape of each coloured face.

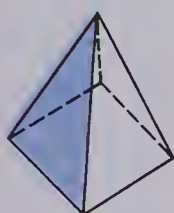
1.



2.



3.



4. How many edges, faces, and corners are there on each solid?

Copy and complete the chart.

Shape	Edges	Faces	Corners
Cube			
Rectangular prism			
Triangular prism			
Square-base pyramid			
Triangular-base pyramid			

BRAINTICKLER

Name the shape.

I roll.

I have no corners.

I have no faces.

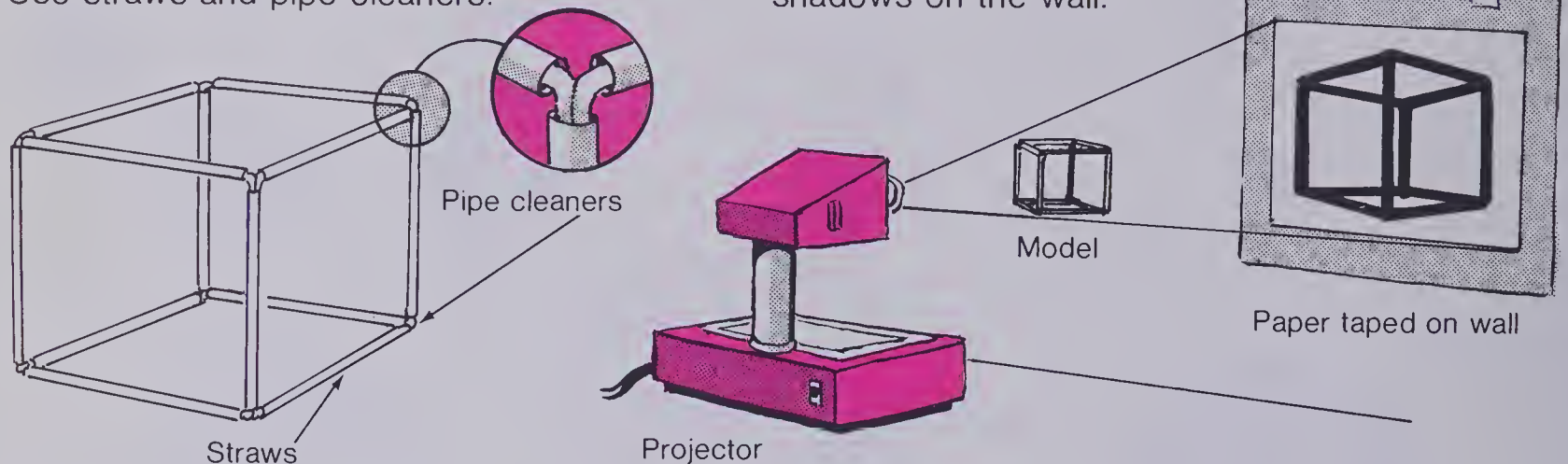
Who am I?

Models and Their Shadows

Work In Pairs

Make a model of a cube.
Use straws and pipe cleaners.

Use your model to make
shadows on the wall.



Exercises

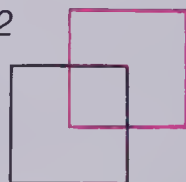
1. How many straws are necessary to make the cube?
2. How many pipe cleaners are necessary to make the circled corner?
3. Make 3 different shadows with your model.
Trace or draw the shadows.
What kind of shape is shown by each of your shadows?

4. Follow these steps to draw a cube.

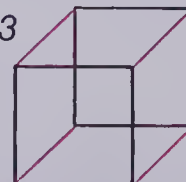
Step 1



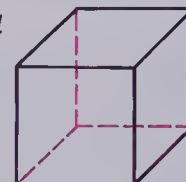
Step 2



Step 3

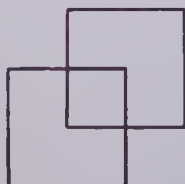


Step 4

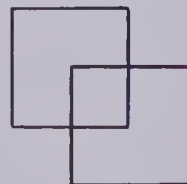


5. Trace and complete each cube.

(a)



(b)



(c)

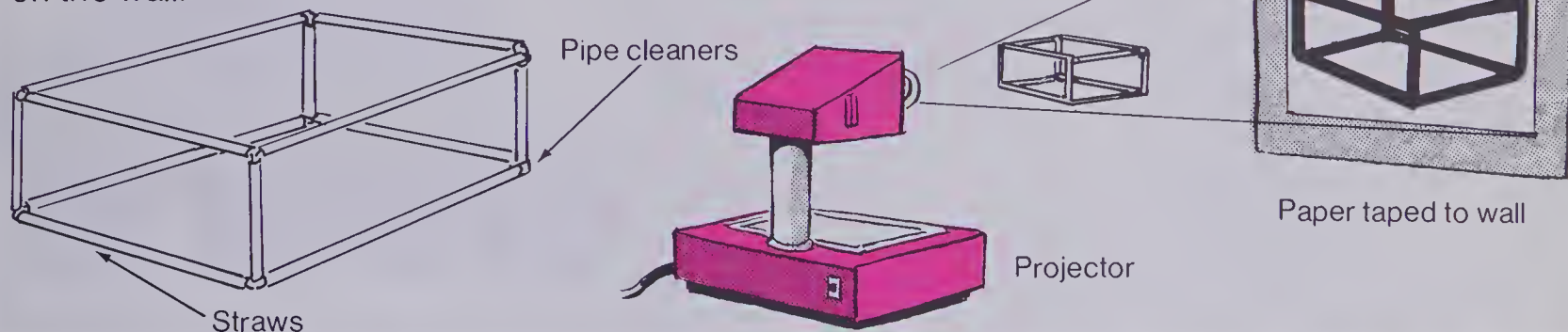


(d)



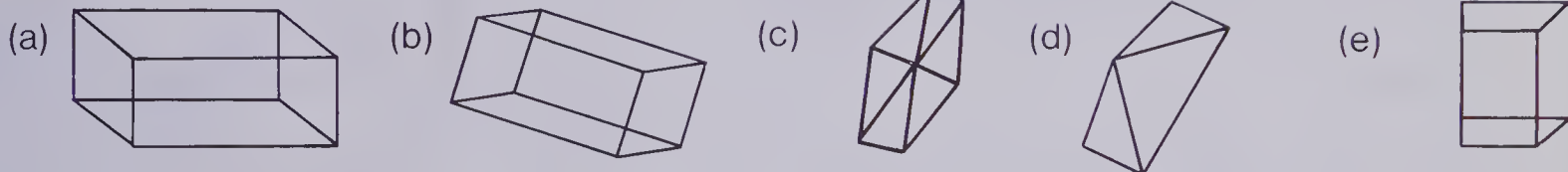
Drawing Rectangular Prisms

Make a model of a rectangular prism.
Use your model to make a shadow
on the wall.



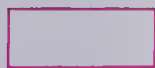
Exercises

1. Make a model of a rectangular prism.
Use it to make shadows.
Which of these shadows can you make?

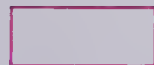


2. Follow these steps to draw a rectangular prism.

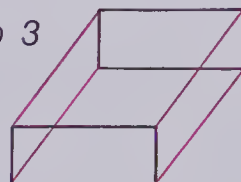
Step 1



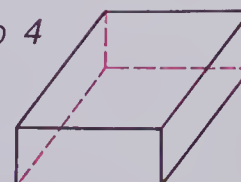
Step 2



Step 3



Step 4



3. Trace and complete each rectangular prism.

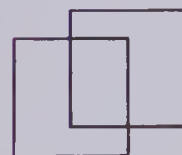
(a)



(b)



(c)



(d)



4. Describe each box you drew using such words as tall, short, thin, thick, long, wide, deep, shallow.

5. Draw a tall, thin box.

6. Draw a shallow, long box.

- ★ 7. Draw a shallow, wide, long box.

- ★ 8. Draw a tall, narrow, long box.

Horses

Sometimes it takes more than one step to solve a problem.

Jackie feeds each of three horses two pails of oats each day.
She also feeds a colt one pail of oats each day.
How many pails of oats does she feed to all of the horses each day?



Step 1. pails for big horses: $2 \times 3 = 6$

Step 2. pails for big horses and colt: $6 + 1 = 7$

Sentence: She feeds the horses 7 pails of oats each day.

Exercises

- Jackie exercised each of the 3 big horses for 3 km each day.
She exercised the colt for 1 km.
How many kilometres were the horses exercised in all?

Step 1. kilometres for big horses:

Step 2. kilometres for all horses:

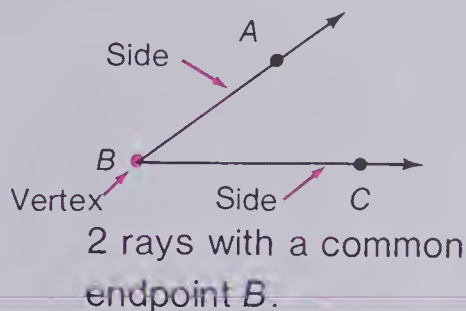
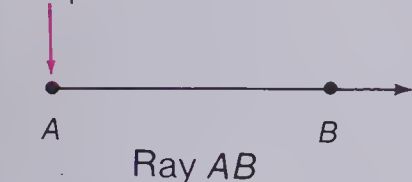
Sentence:

- Each of the big horses has a mass of 600 kg.
The colt has a mass of 300 kg.
What is the total mass of the 4 horses?
- Jackie bought three dozen apples for her horses.
She fed 16 to the horses.
How many apples does she have left?
- Jackie bought a saddle and 6 pairs of horseshoes.
The saddle cost \$200.
Each pair of horseshoes cost \$5.90.
How much did the saddle and horseshoes cost together?
- The cost of boarding the big horses is \$85 a month.
It costs \$50 a month for the colt.
How much a month does it cost to board the four horses?

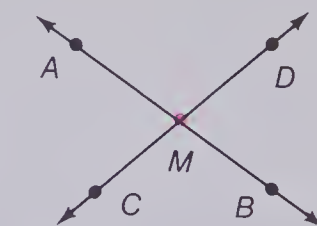


Angles

Endpoint



Name: angle ABC
or angle CBA

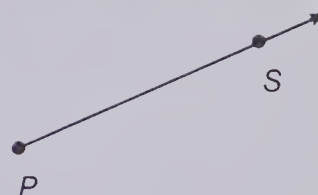
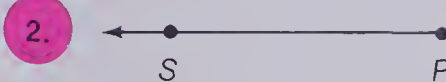


2 lines with a common point.

The lines intersect at point M .

Exercises

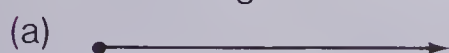
The endpoint of a ray is named first. Name each ray.



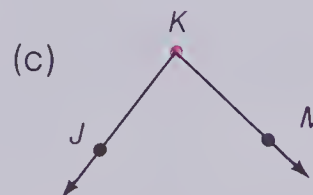
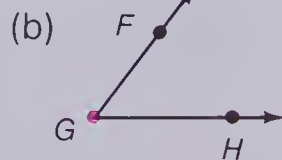
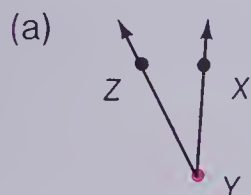
4. Draw.

- (a) a ray (b) an angle CDE (c) two intersecting lines (d) a line

5. Name each figure.

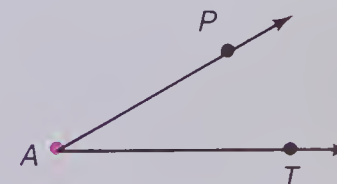


6. Name the vertex of each angle.

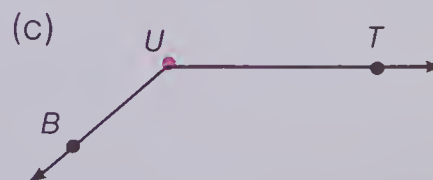
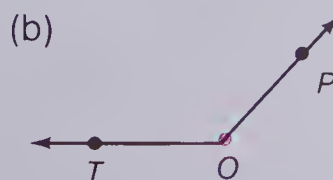


7. Name the rays or sides of each angle in Exercise 6.

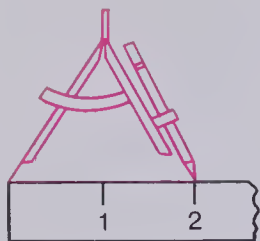
8. One name for this angle is angle PAT . Write another name.



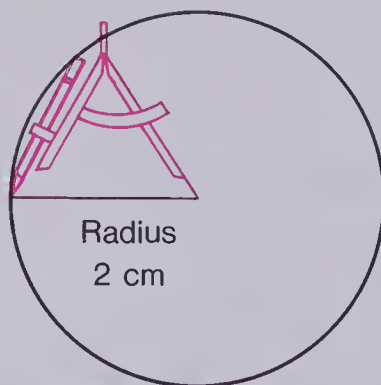
9. Name each angle two ways.



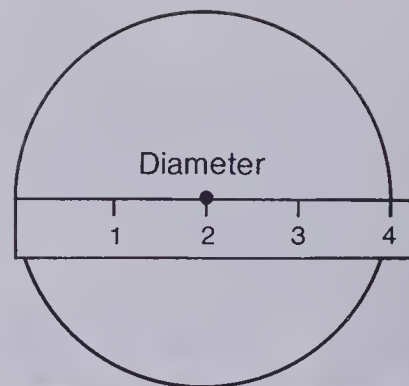
The Circle



Open compasses to 2 cm.



Draw circle.



Place ruler across circle touching centre.

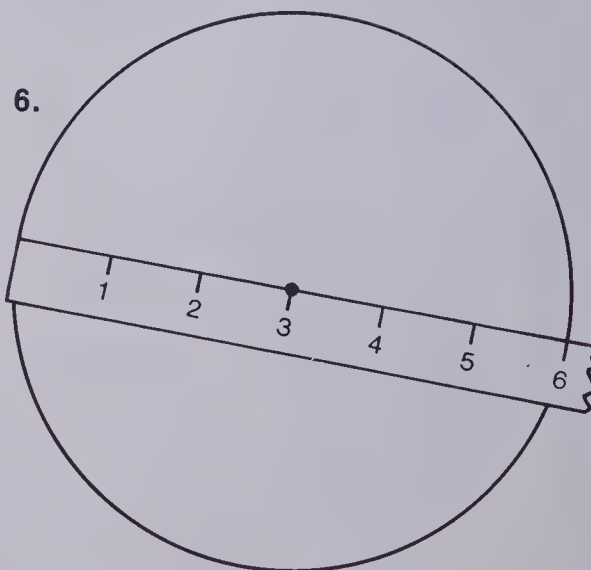
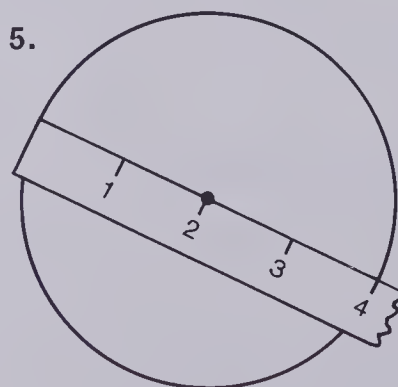
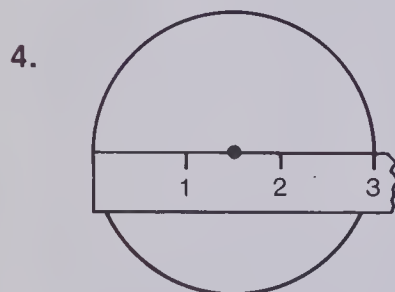
Exercises

1. Use compasses to draw a circle.
Mark and label: centre, radius, diameter.

Copy and complete.

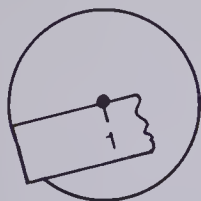
2. The distance across a circle touching the centre is the of the circle.
3. The distance from the centre to the edge of the circle is the .

What is the measure in centimetres of these diameters?

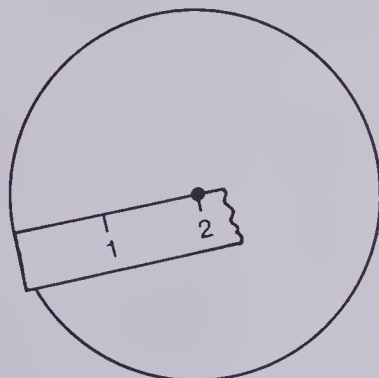


What is the measure in centimetres of each radius?

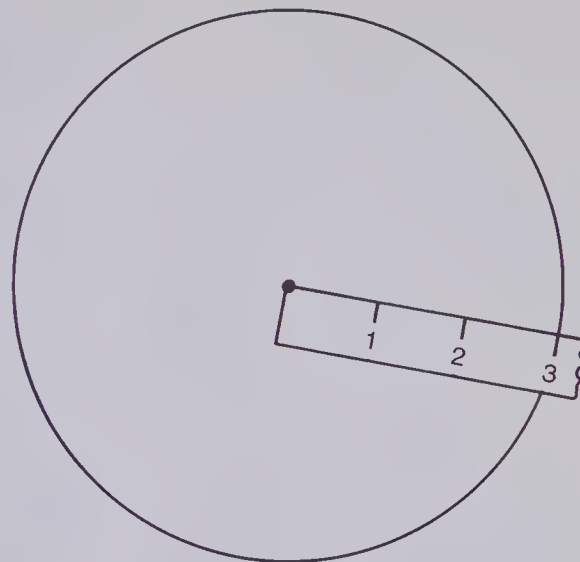
7.



8.



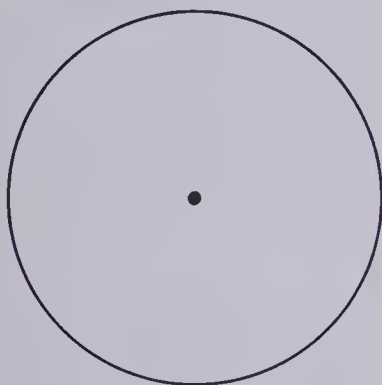
9.



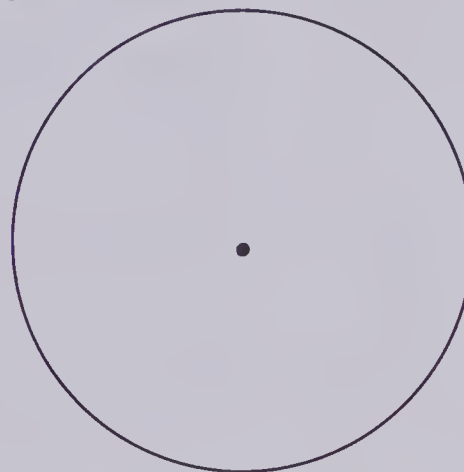
Use a ruler to find the measure of

- (a) the radius of each (b) the diameter of each.

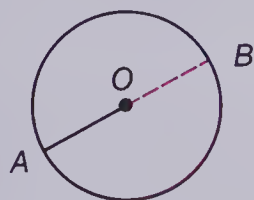
10.



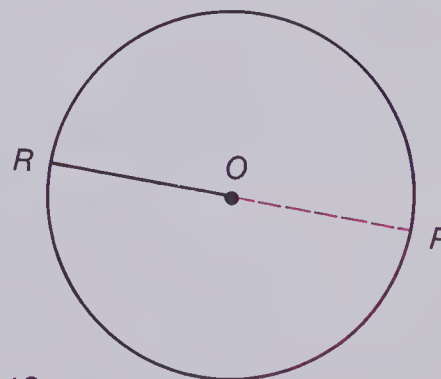
11.



12. The measure of radius AO is 1 cm.
What is the length of radius OB ?
What is the length of the diameter AB ?



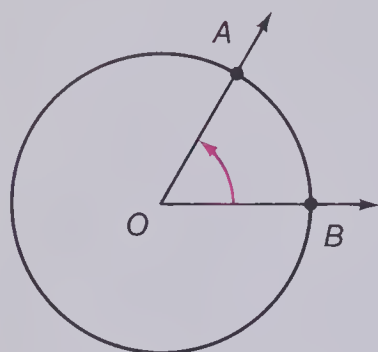
13. The measure of radius RO is 2 cm.
What is the measure of radius OP ?
What is the length of the diameter RP ?



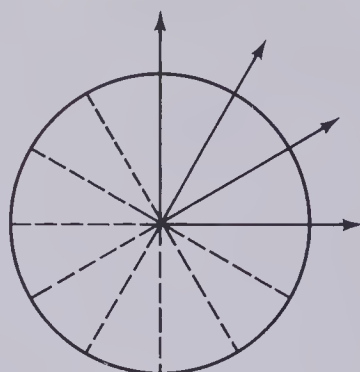
14. Use the method shown to draw a circle with a radius of
(a) 2 cm (b) 3 cm (c) 4 cm.
15. What is the diameter of each circle you drew in Exercise 14?

- ★16. What is the relationship between the lengths of the radius and the diameter of a circle?

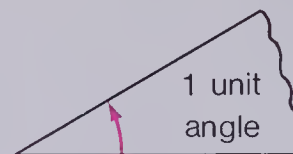
Measuring Angles



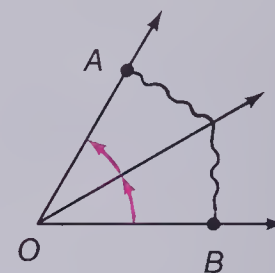
The size of an angle is measured by the amount of rotation of one ray from the first ray.



We will use one of these parts as a unit of measure.



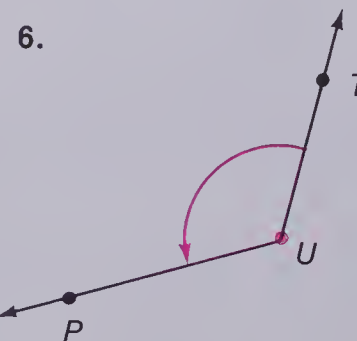
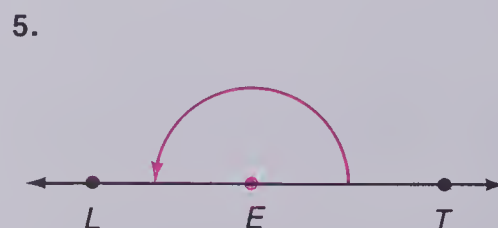
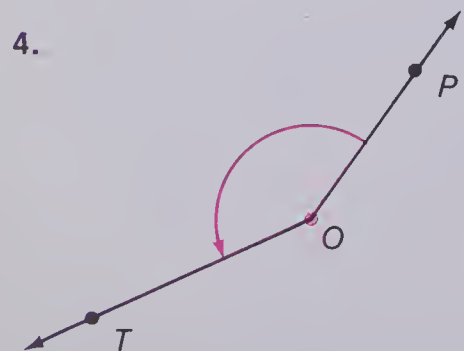
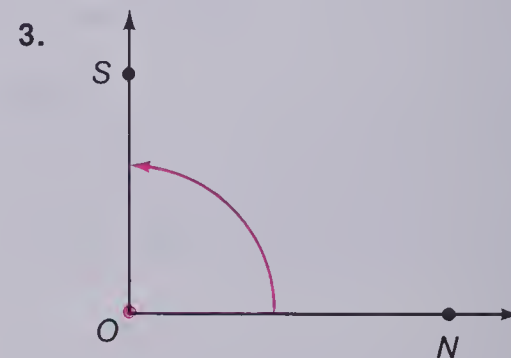
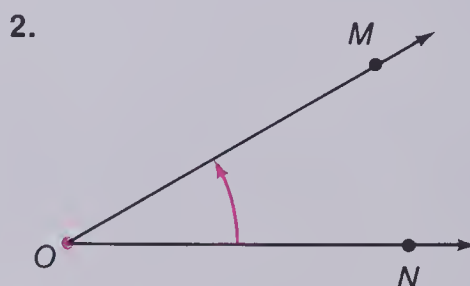
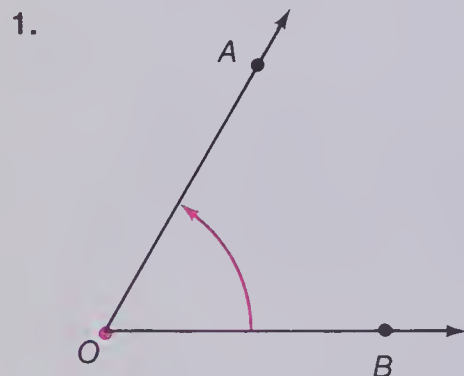
Copy and make 6 of these unit angles.



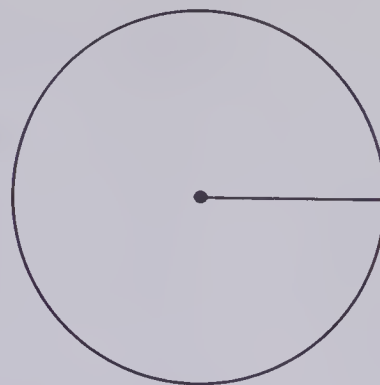
The measure of angle AOB is 2 unit angles.

Exercises

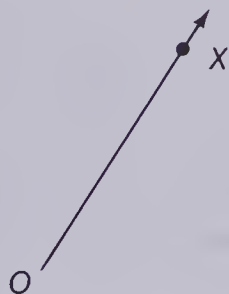
Place the unit angles you made on each angle to find its measure. Write a statement.



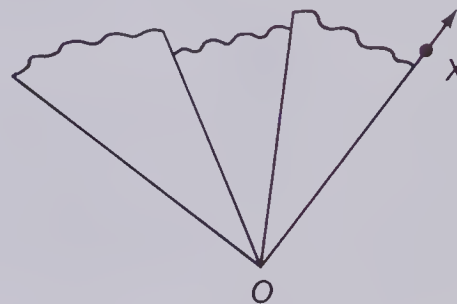
7. How many unit angles fit in a circle?



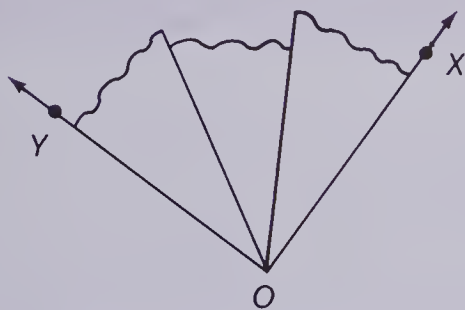
8. Follow these steps to draw an angle with a measure of 3 units.



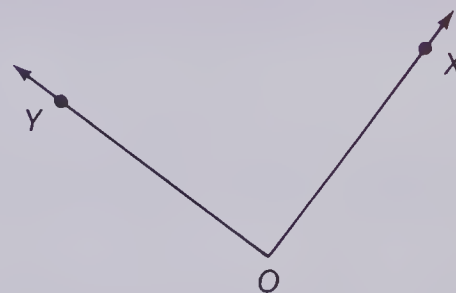
Draw and name a ray.



Place 3 unit angles on ray.



Draw second ray and name.



Angle XOY has a measure of 3 units.

9. Draw and name an angle with a measure of

(a) 2 units

(b) 6 units

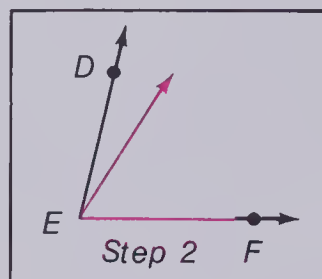
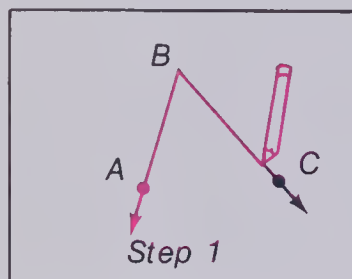
(c) 5 units

(d) 4 units

10. What is the name of the angle with a measure of 3 units?

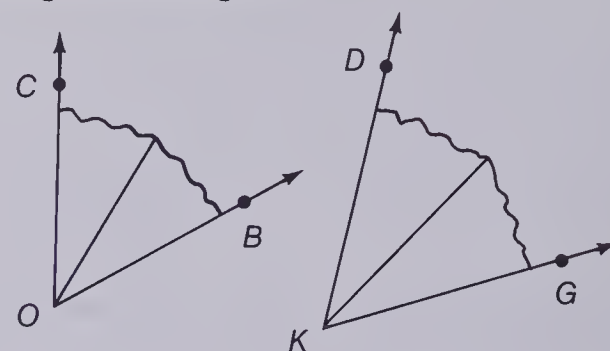
Congruent Angles

Two methods of identifying **congruent angles**



Angle ABC is not congruent to angle DEF .

1. Trace one angle.
2. Place tracing over the second angle.
3. If the two match, the angles are congruent.

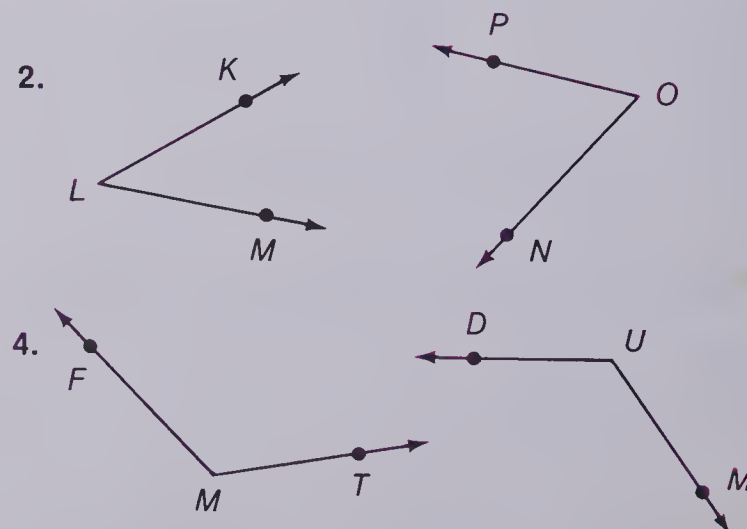
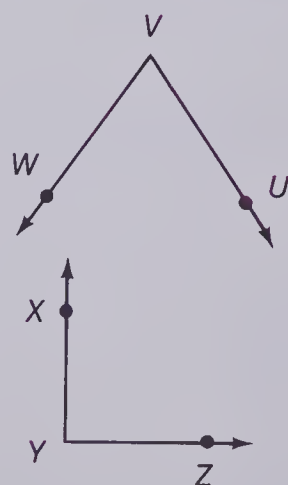
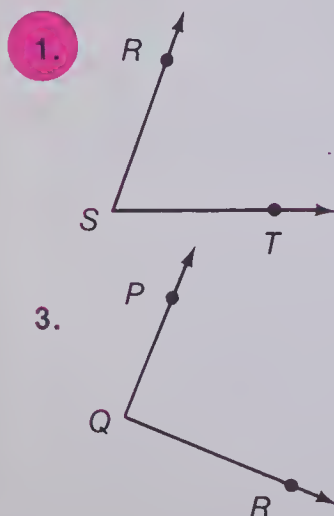


1. Use unit measures to find the size of each angle.
2. If measures are the same the angles are congruent.

Congruent angles have the same measure.

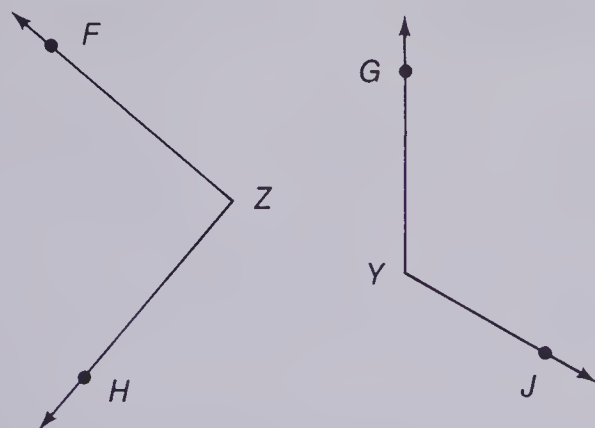
Exercises

Are the angles congruent? Use the tracing method. Write a statement.

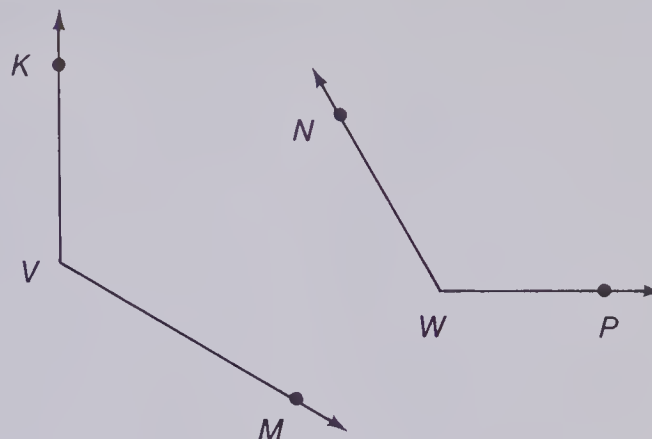


Are the angles congruent? Use the measuring method. Write a statement.

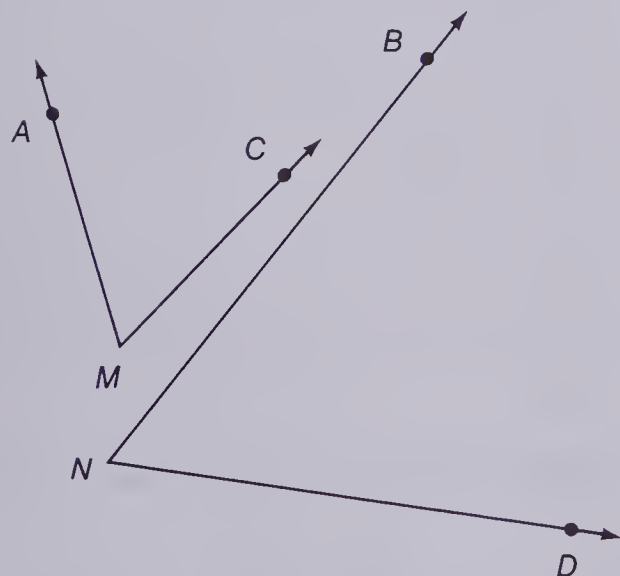
5.



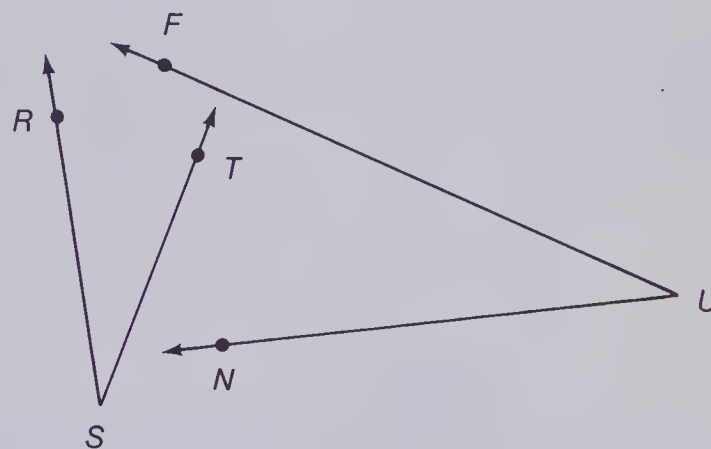
6.



7.

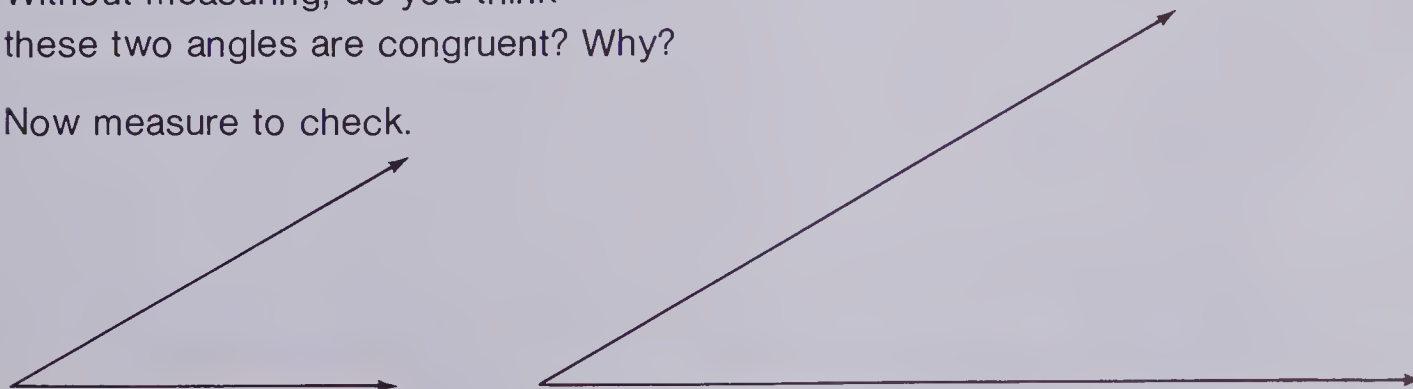


8.

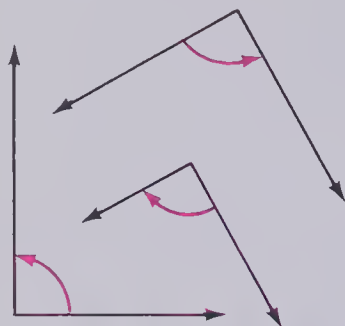


9. Without measuring, do you think these two angles are congruent? Why?

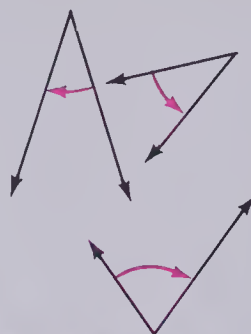
Now measure to check.



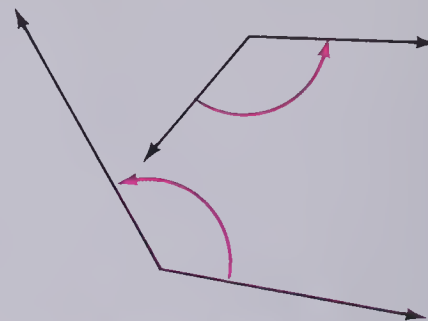
Types of Angles



Right angles



Acute angles

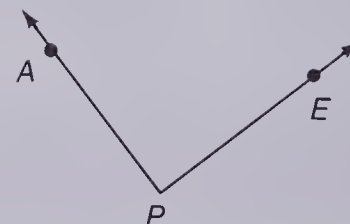
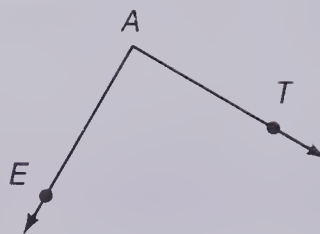
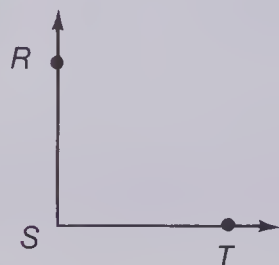


Obtuse angles

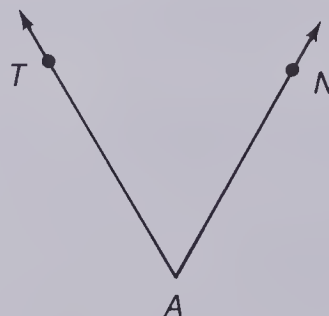
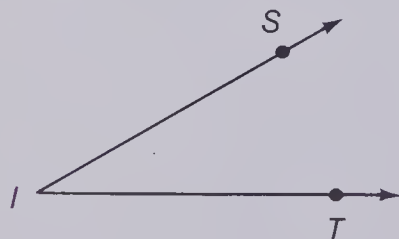
Exercises

Use your unit angles.

1. What is the measure of each right angle?



2. What is the measure of each acute angle? Are the measures less or more than that of a right angle?



3. Find examples in your classroom of:

(a) right angles

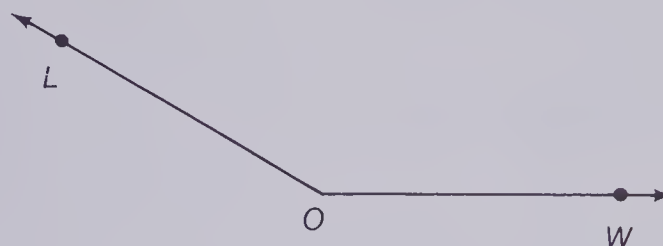
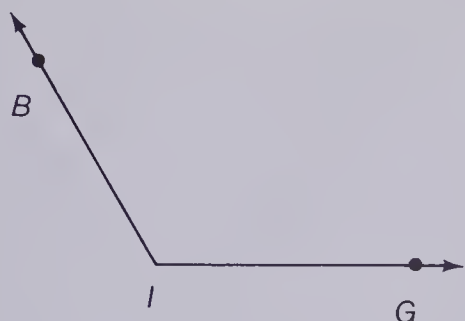
(b) acute angles

(c) obtuse angles.

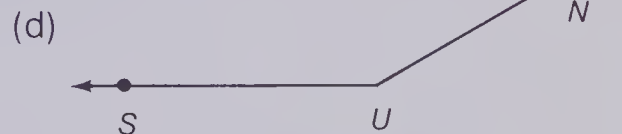
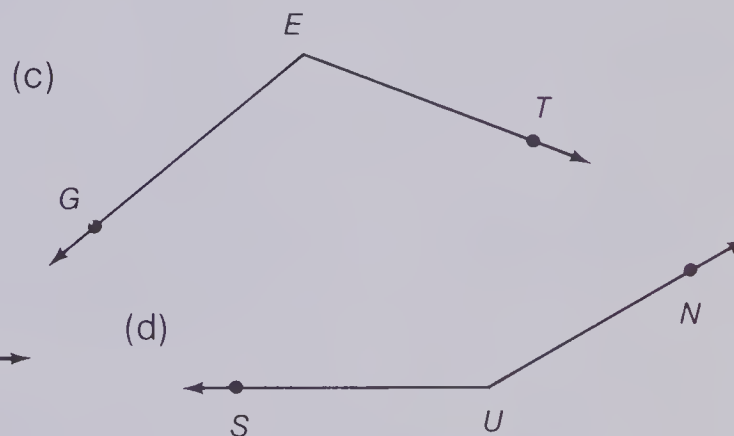
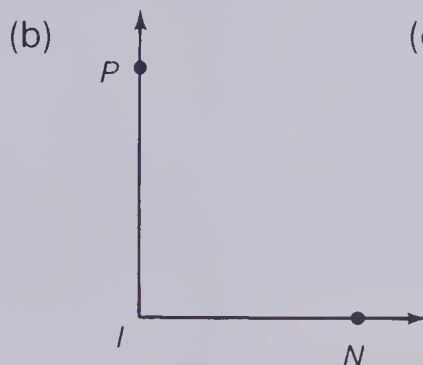
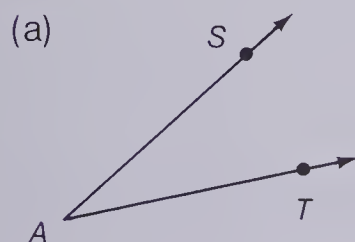
Which angle was easiest to find?

4. What is the measure of each obtuse angle?

How does the measure of each compare to the measure of a right angle? an acute angle?



5. Name the type of each angle.



6. Write these two headings in your workbook:

an obtuse angle

an acute angle

Now write each of these statements under the correct heading:

- (a) an angle greater than a right angle.
- (b) an angle less than a right angle.
- (c) the corner of a coat hanger.
- (d) the angle of a hockey stick.
- (e) the hands of a clock at 11:00.

7. Draw

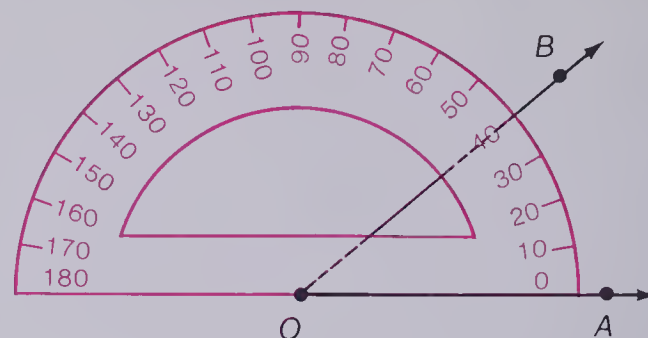
- (a) a right angle.
- (b) two different acute angles.
- (c) two different obtuse angles.



The Protractor

A standard unit of measure of an angle is the **degree**.

A **protractor** has a scale marked in degrees ($^{\circ}$).



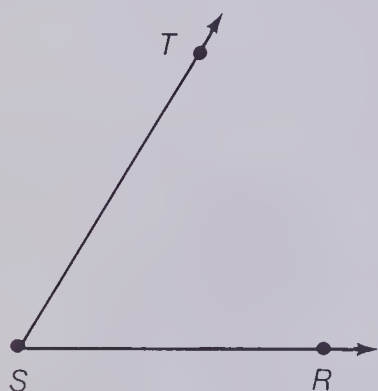
The measure of $\angle AOB$ is 40° .

Exercises

- Follow these steps to measure an angle.

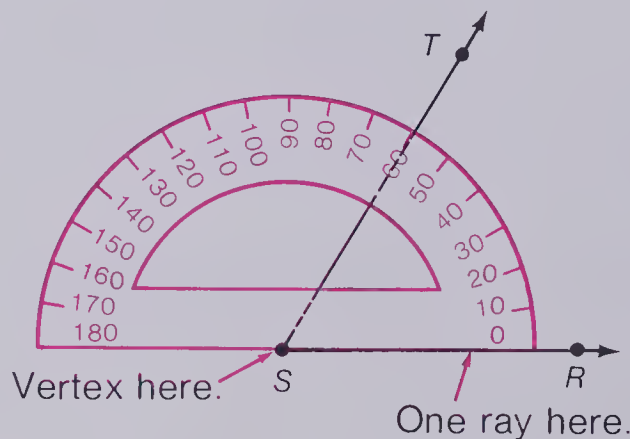
Step 1

Draw an angle.



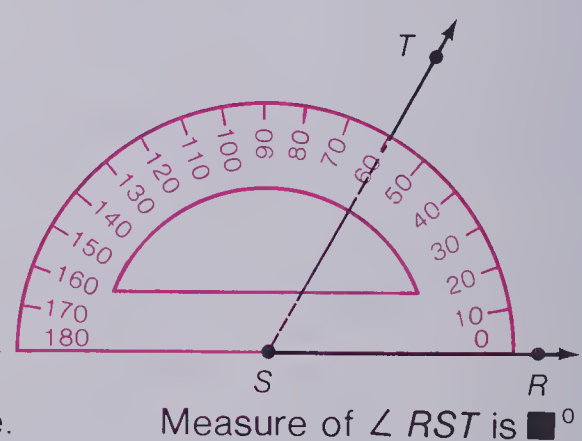
Step 2

Place protractor on angle like this.



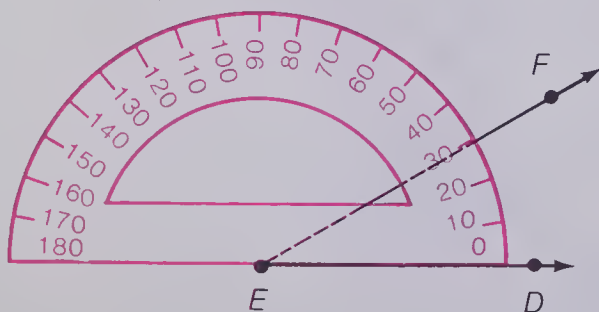
Step 3

Read the angle measure.

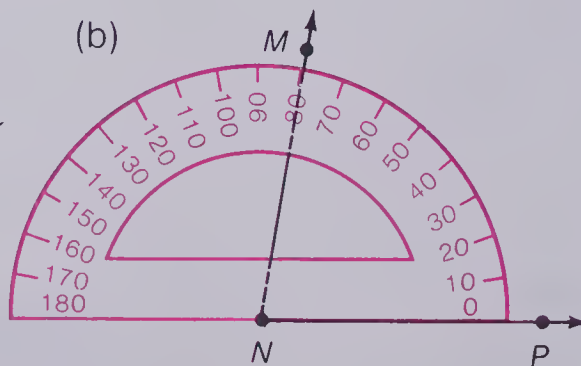


- Read the measure of each angle.

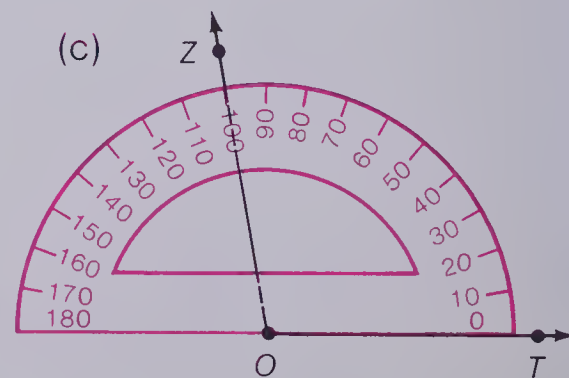
(a)



(b)



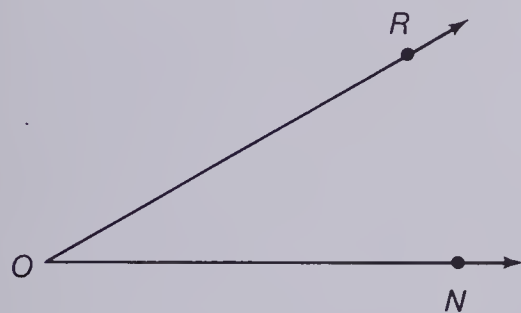
(c)



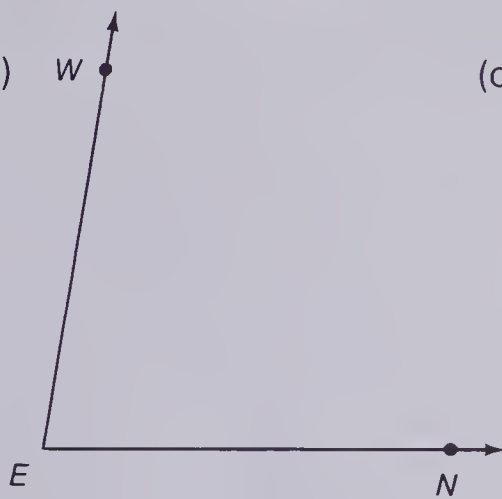
Place your protractor on each angle. Record the measure in degrees.

3. Acute angles

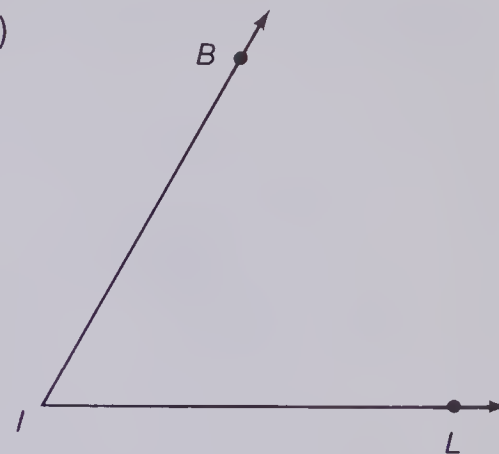
(a)



(b)

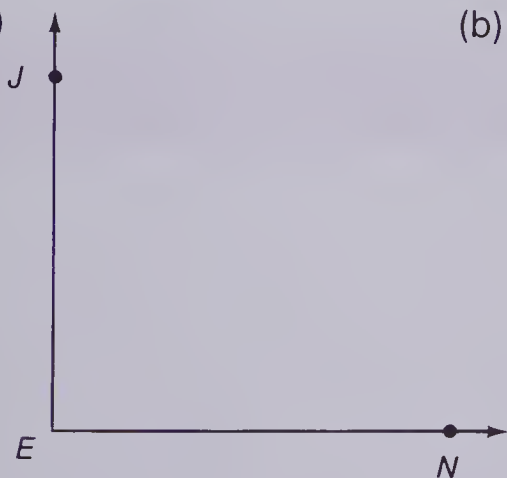


(c)

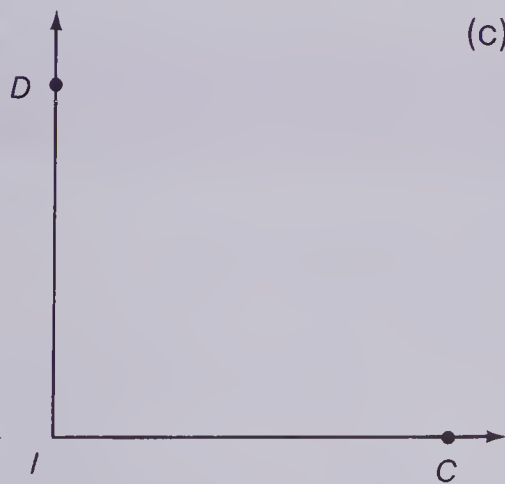


4. Right angles

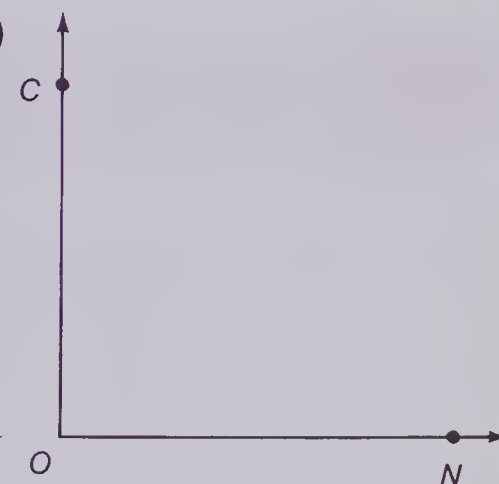
(a)



(b)

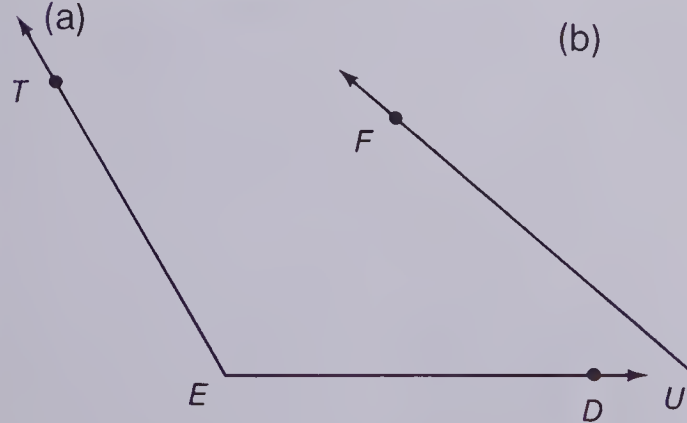


(c)

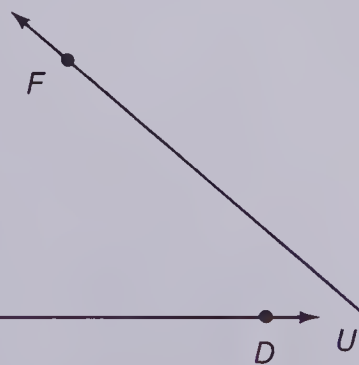


5. Obtuse angles

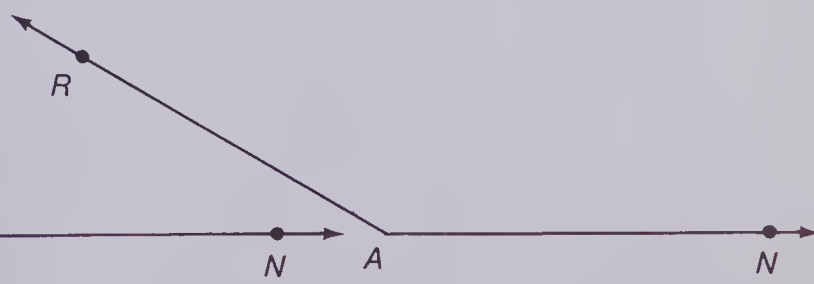
(a)



(b)

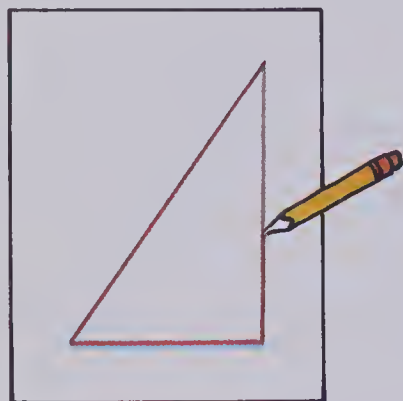


(c)

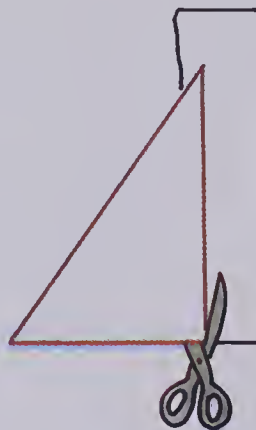


Congruent Polygons

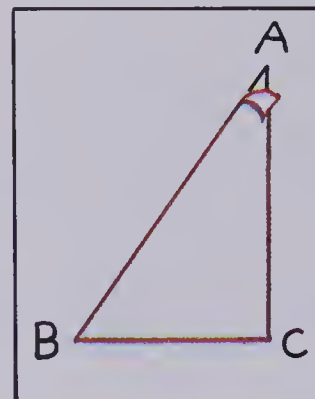
A **polygon** is a plane shape with 3 or more sides.



Trace one triangle.



Cut out carefully.



Check to see if it matches second triangle.

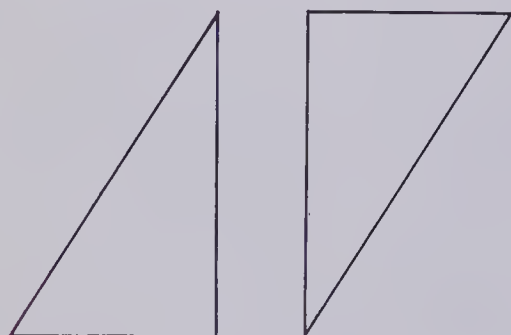
You may have to flip, slide, or turn the cutout to make it match the other shape.

Two polygons are congruent if they have the same size and shape.

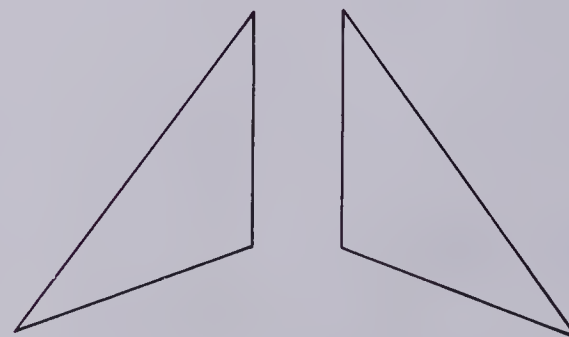
Exercises

Are the polygons congruent? Guess. Then check.

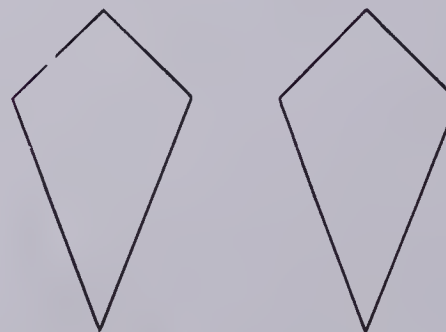
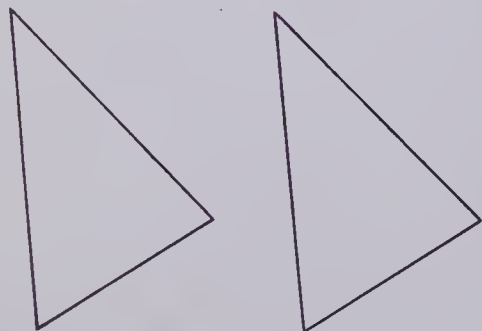
1.



2.

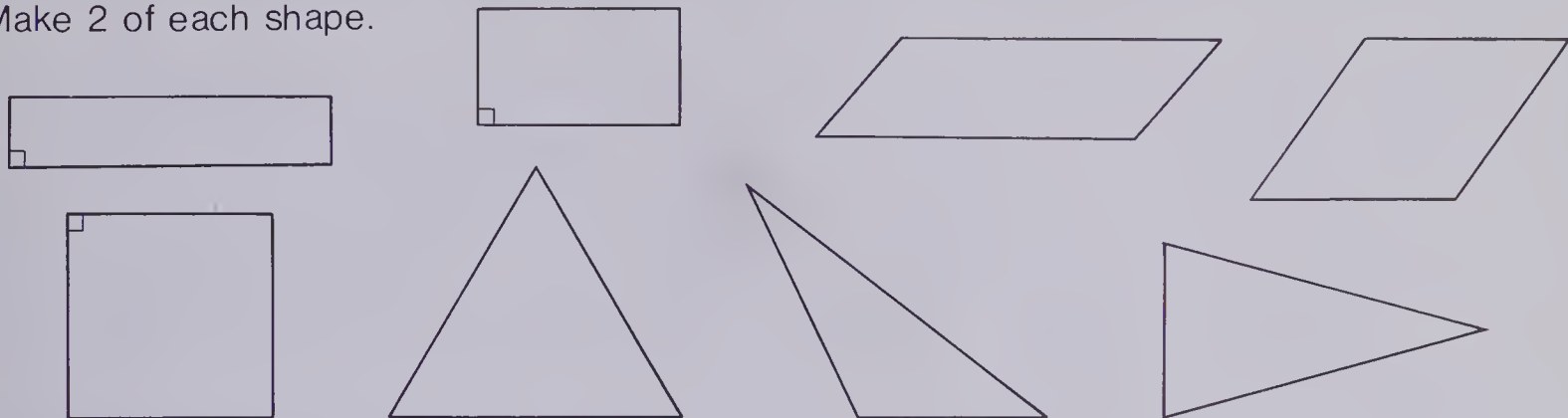


3.

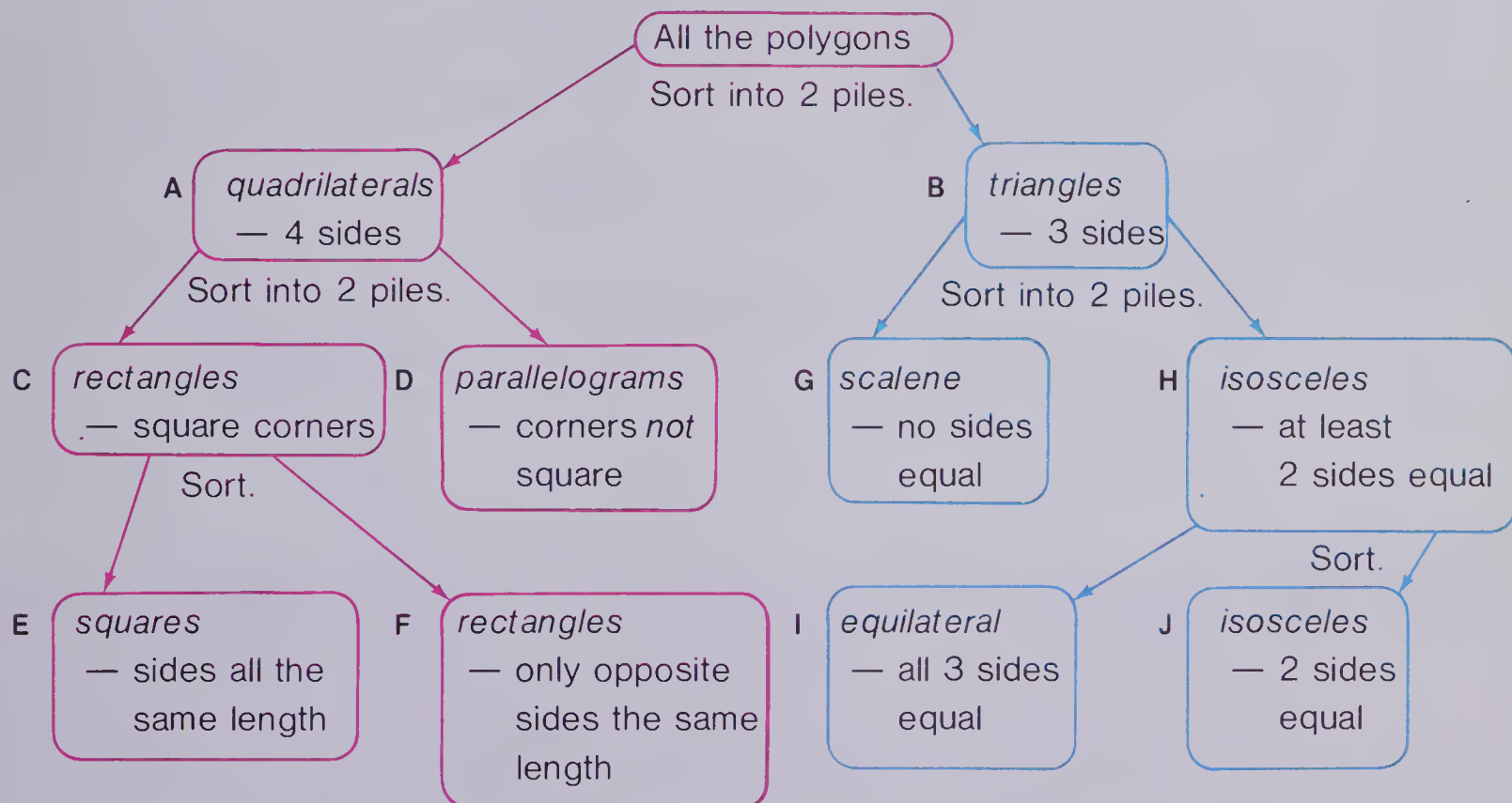


Activity

Make 2 of each shape.



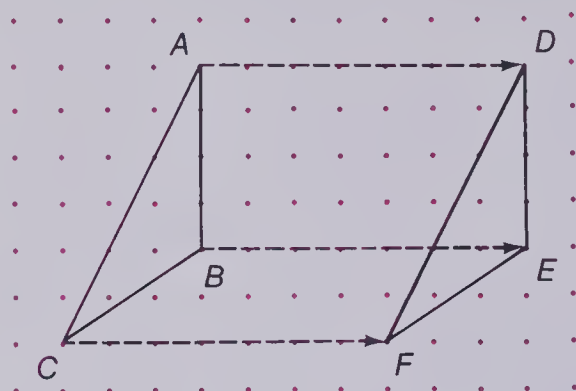
Put all the polygons in one pile and sort according to the following statements.



Describe each polygon: square, rectangle, parallelogram, scalene triangle, isosceles triangle, equilateral triangle. The first one is done for you.

Square: 4 sides, square corners, all sides equal.

Matching Parts of Congruent Triangles



Vertex — corner

Vertices — plural
for vertex

$A \rightarrow D$

Vertex A matches vertex D .

$B \rightarrow E$

Vertex B matches vertex E .

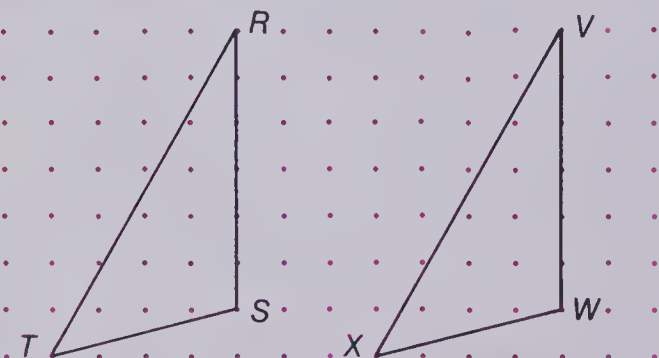
$C \rightarrow F$

Vertex C matches vertex F .

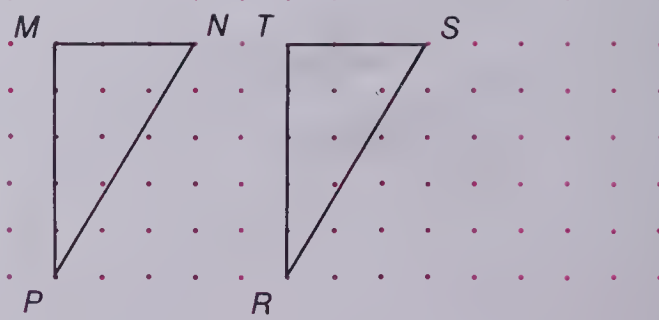
Exercises

The triangles in each pair are congruent. They match by a **slide**.
Name the vertices that match.

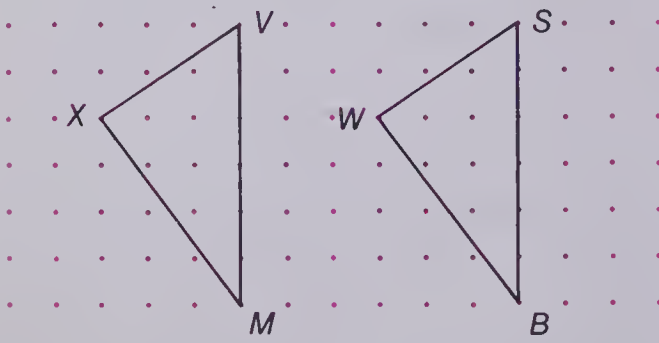
1.



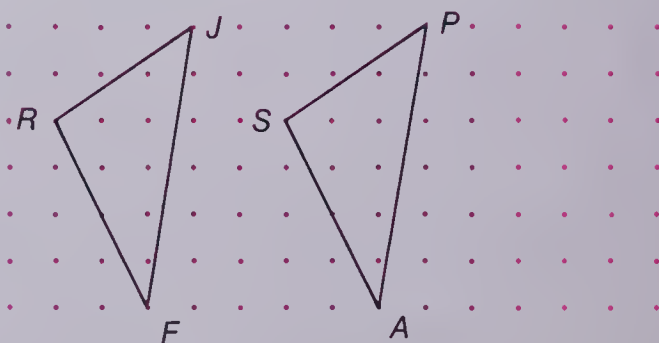
2.



3.



4.



The triangles in each pair are congruent. They match by a **flip**. Name the matching vertices. Use a plastic mirror if necessary.

The triangles in each pair are congruent. They match by a **turn**. Name the matching vertices. Use cutouts if necessary.

BRAINTICKLER

0 1 2 3 4 5 6 7 8 9

Use each number once only.

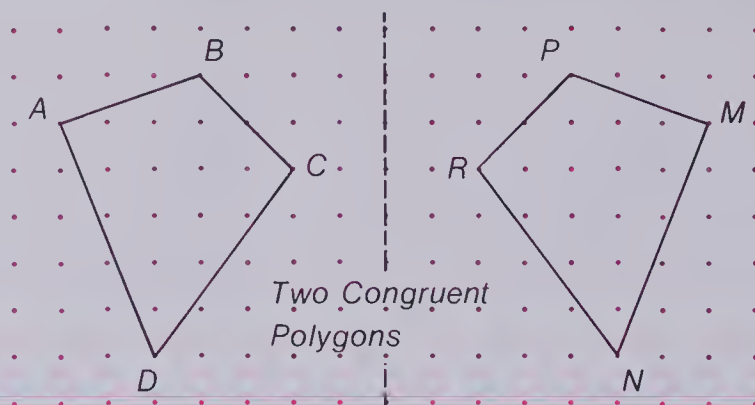
Make an addition question with the answer.

There are to be two three-digit numbers with the sum a four-digit number.

$$\begin{array}{r} \\ + \end{array}$$

Matching Parts of Congruent Polygons

Vertices
A matches M.
A → M
C matches R.
C → R



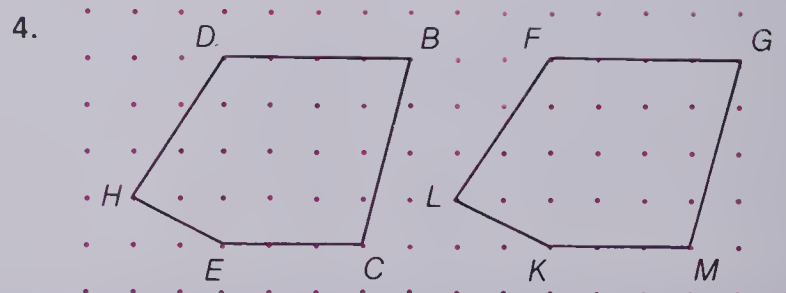
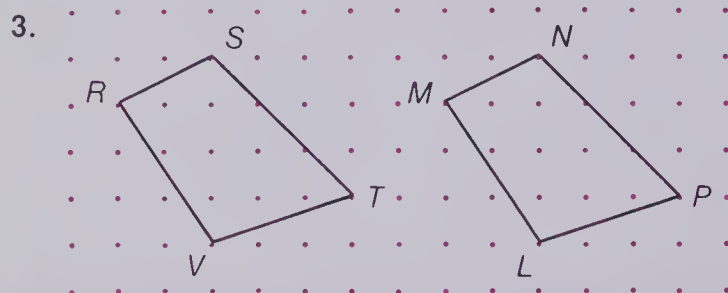
Sides
AB matches MP.
AB → MP
CD matches RN.
CD → RN

Exercises

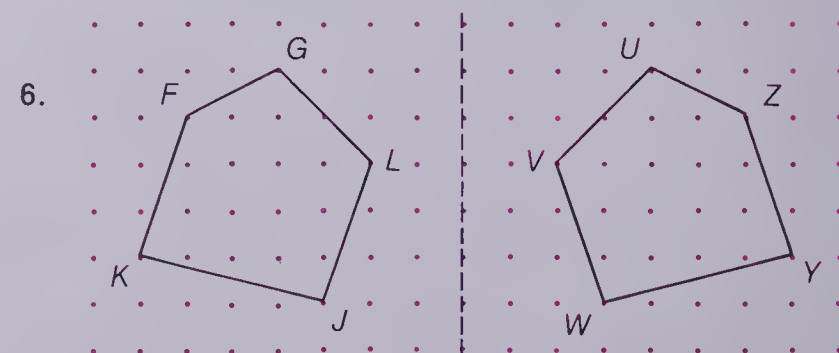
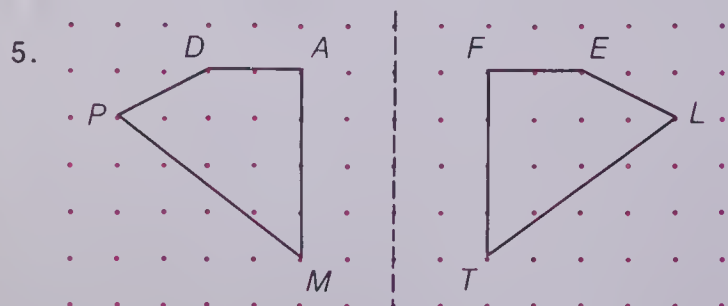
Refer to the display.

1. Name the other matching vertices of the polygons.
2. Name the other matching sides of the polygons.

The polygons in each pair are congruent. They match by a slide.
 Name the matching vertices and sides.

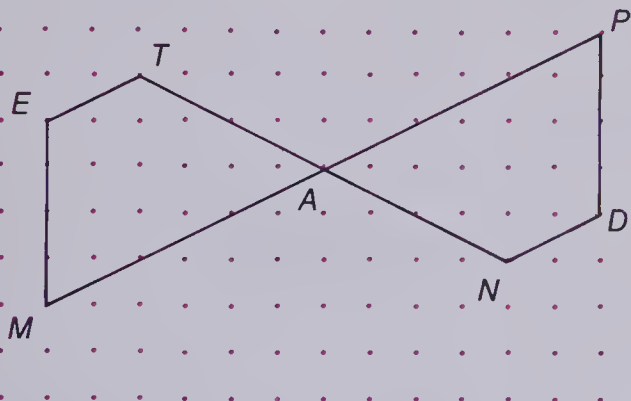


The polygons in each pair are congruent. They match by a flip.
 Name the matching vertices and sides.

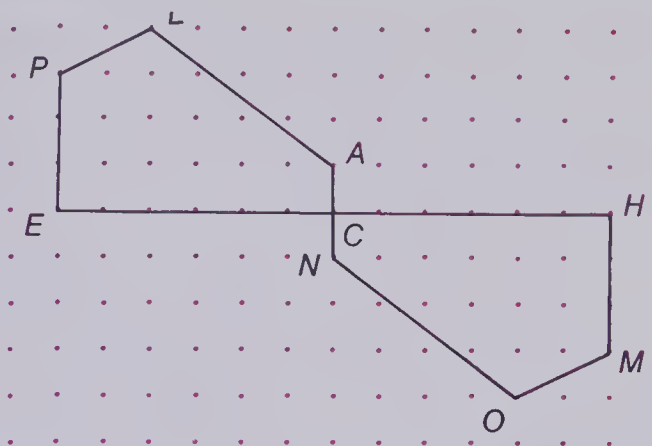


The polygons in each pair are congruent. They match by a turn.
Name the matching vertices and sides.

7.

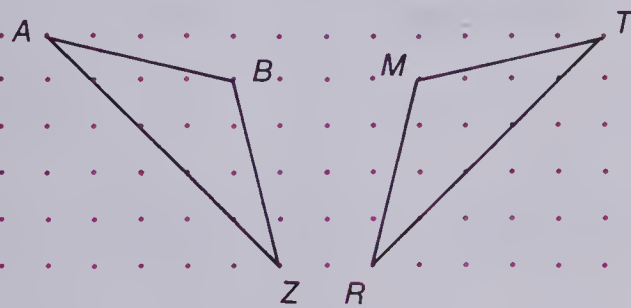


8.

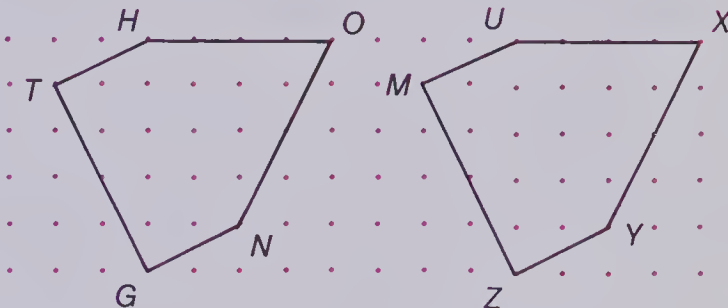


The polygons in each pair are congruent. Identify each as a turn, slide, or flip.
Name the matching vertices and sides.

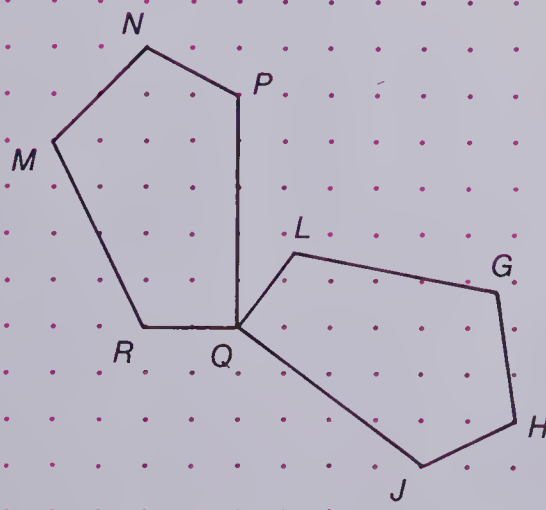
★ 9.



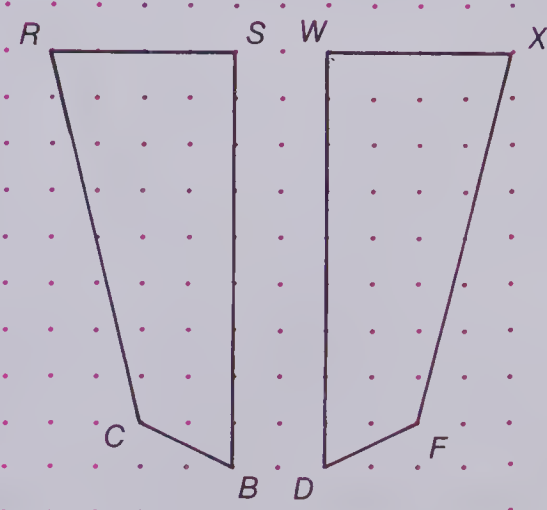
★ 10.



★ 11.

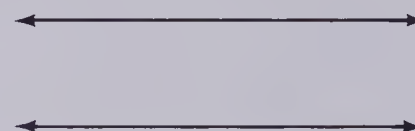
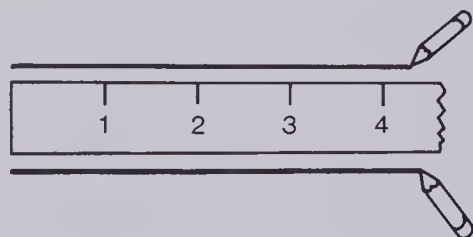


★ 12.



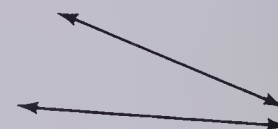
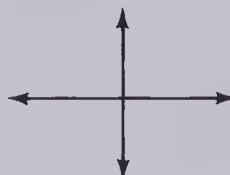
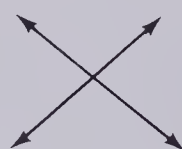
Parallel Lines

Marcus drew two **parallel lines** along the edge of his ruler.



These lines are parallel.

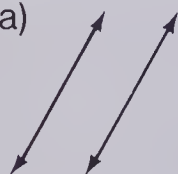
These lines are not
parallel.
They intersect.



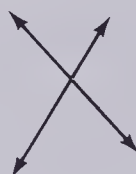
Exercises

1. Which of these pairs of lines are parallel?

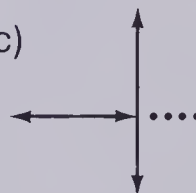
(a)



(b)



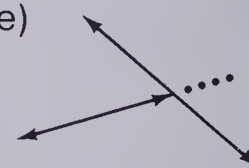
(c)



(d)

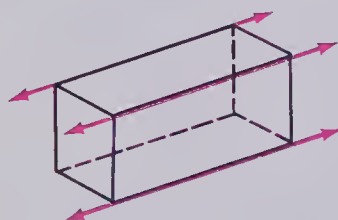


(e)

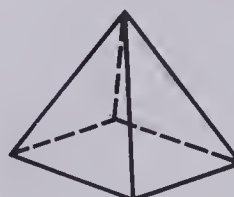


2. Identify parallel lines on these shapes. Trace each and draw on the parallel lines.

(a)



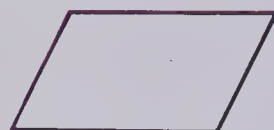
(b)



(c)



(d)



(e)



(f)



(g)

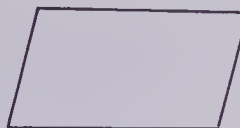
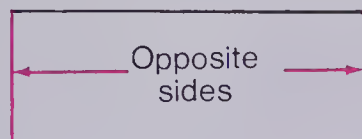


3. Draw a pair of parallel lines using your ruler.

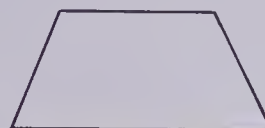
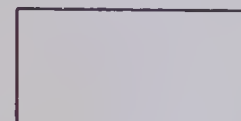
4. Identify 5 sets of parallel lines in your classroom.

5. Identify 5 sets of intersecting lines in your classroom.

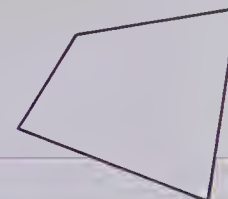
Parallelograms



Parallelograms



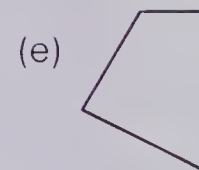
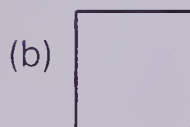
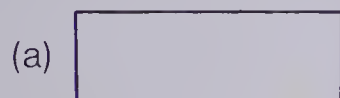
Not parallelograms



Parallelograms have (a) four sides
(b) both pairs of opposite sides parallel.

Exercises

1. Which of these shapes are parallelograms?



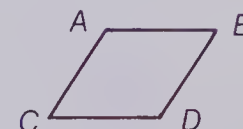
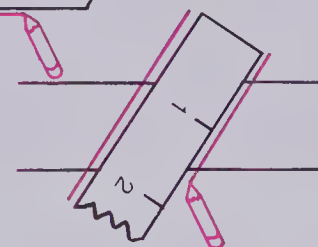
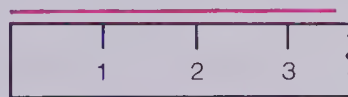
2. Draw a parallelogram using your ruler.

Draw along two edges of your ruler.

Move ruler as shown. Draw along edges again.

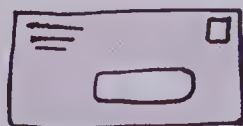
Erase ends. Label $ABCD$.

$ABCD$ is a parallelogram.



3. Use other objects to draw 5 different parallelograms.

Hint:



4. Identify parallelograms in your classroom.

Drawing Cylinders and Cones

To draw a cylinder:

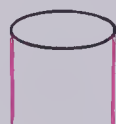
Step 1

Draw a flattened circle for the top.



Step 2

Draw the sides.



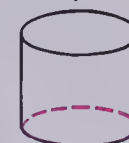
Step 3

Draw a flattened circle for the bottom.



Step 4

Use dotted line to show part out of sight.



To draw a cone:

Step 1

Draw two congruent sides of a triangle.



Step 2

Draw a flattened circle for the base.



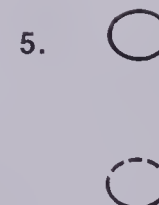
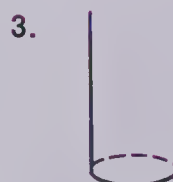
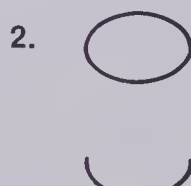
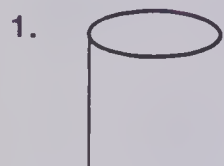
Step 3

Use dotted line to show part out of sight.

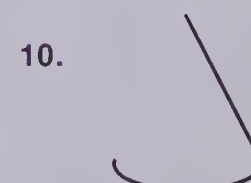
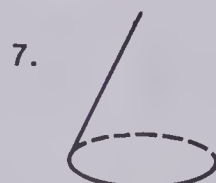


Exercises

Trace and complete each cylinder.



Trace and complete each cone.



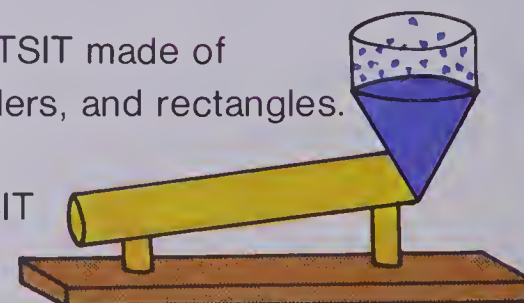
11. Draw a tall thin cylinder.

12. Draw a short thick cylinder.

13. Draw a tall thin cone.

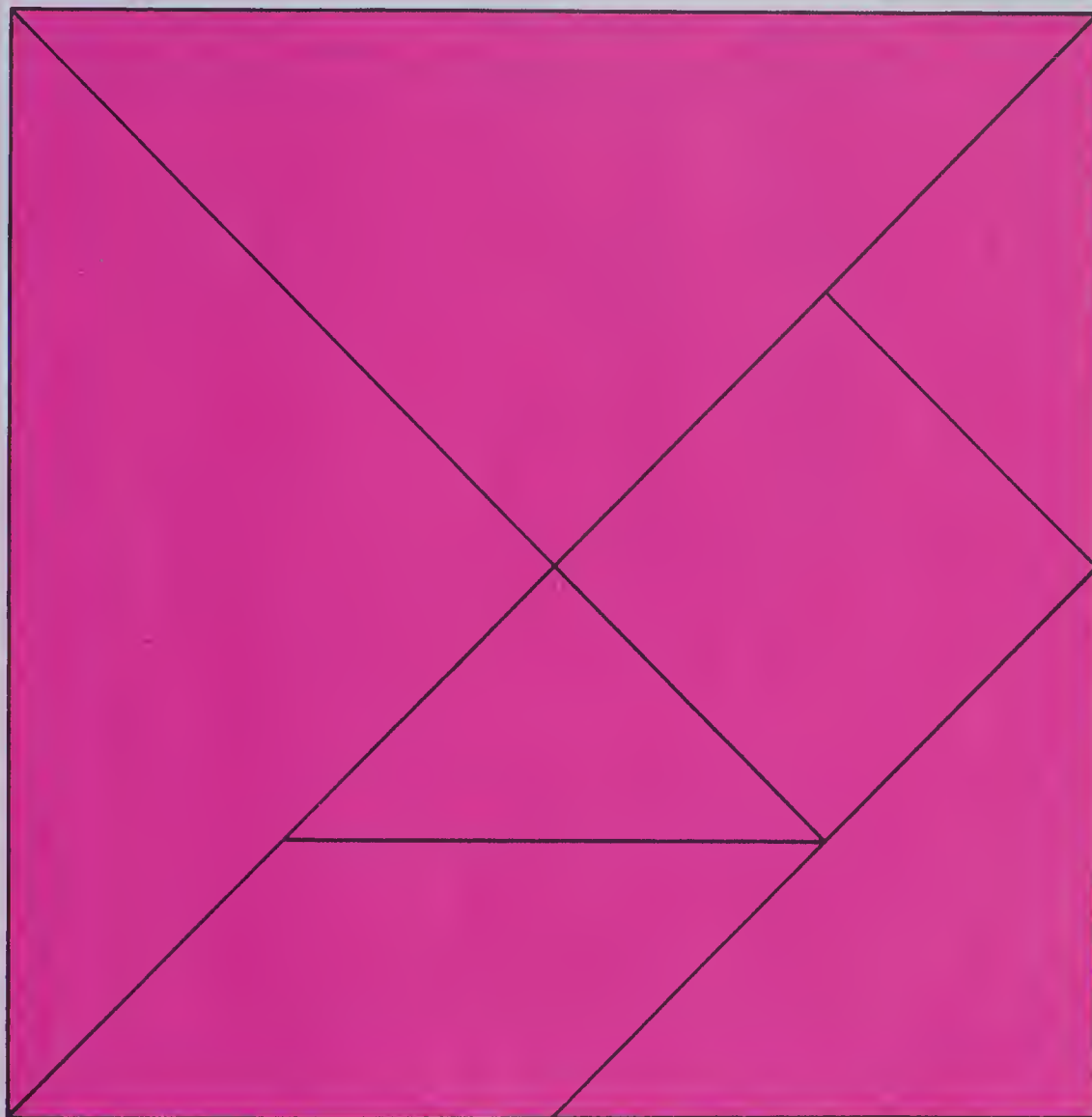
14. Draw a short thick cone.

15. Draw a WHATSIT made of cones, cylinders, and rectangles. What does your WHATSIT do?



A Chinese Puzzle

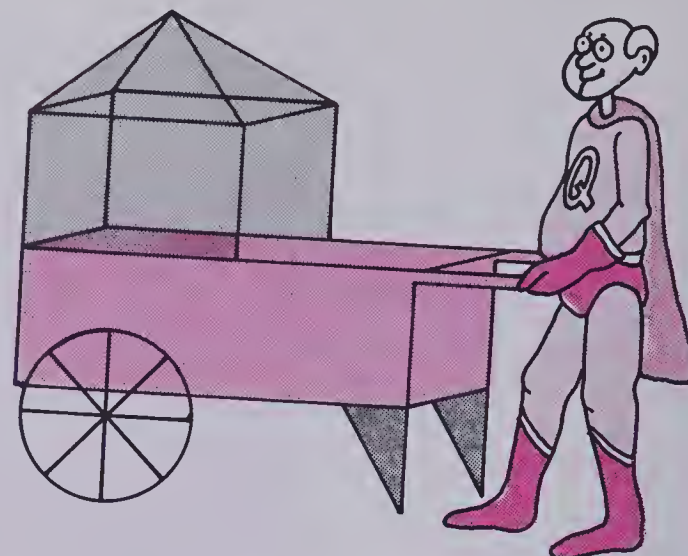
Make this tangram.



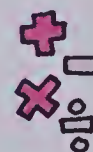
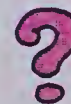
Trace the shape.
Glue it on cardboard.
Cut carefully into 7 pieces.
Make different patterns.
Trace and colour each shape.



The Concession Business



Remember Professor Q's questions.



1. The popcorn man sold 2 large, 3 small, and 2 buttered boxes of popcorn. How much did this order cost?
2. Expenses for one day were \$6.50. Meals cost \$5.10. Total sales were \$74.65. How much more was his total sales than the meals and expenses together?
3. One can of corn makes 24 large and 12 small boxes. In one day 6 cans were used. How many boxes altogether?
4. One day at the beach the popcorn man sold 84 large, 70 small, and 65 buttered boxes of popcorn. How much did he receive?
5. One can of corn makes 30 large boxes. He plans to sell 60 large boxes in the morning and 120 large boxes in the afternoon. How many cans of corn does he need?
6. A customer gave him a ten-dollar bill for 5 large, 2 small, and 4 buttered boxes of popcorn. What change should the customer get?
- ★ 7. The popcorn man makes 25¢ profit on each box he sells. He sold 51 boxes in the morning, 36 boxes in the afternoon, and 22 boxes in the evening. How much profit altogether for that day?

Drawing Pictures to Solve Problems

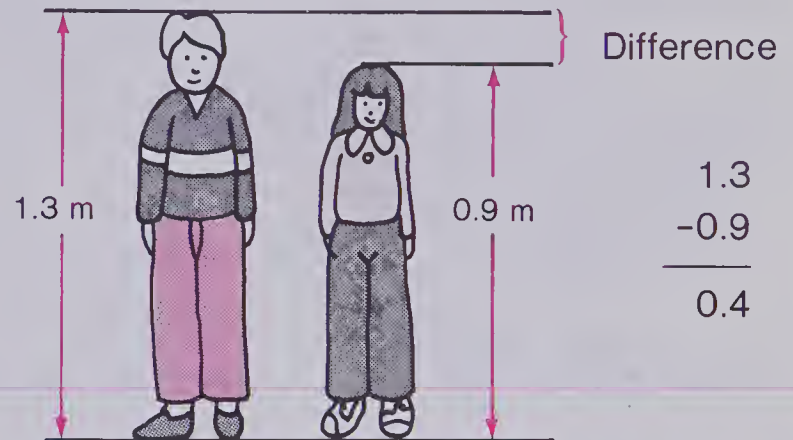
Drawing a picture often helps solve a problem.

Jesse is 1.3 m tall.

Bess is 0.9 m tall.

How much taller is Jesse?

A picture may look like this.



Jesse is 0.4 m taller than Bess.

Exercises

Draw a picture for each. Solve.

- Bob's dog is 0.9 m tall.
Bill's dog is 0.7 m tall.
How much taller is Bob's dog?
- Brent ran 4.5 m.
Bob ran 3.6 m.
How much farther did Brent run?
- It is 1.6 km from Donna's house to her school.
Donna walks 0.8 km towards school.
How much farther has she to go?
- The sides of a triangle are 11.2 cm, 8.8 cm, and 14.6 cm.
How far around the triangle?
- Muriel threw the ball 3.3 m.
Debbie threw the ball 4.1 m.
How much farther did Debbie throw the ball?
- Freddy, the frog, jumped 1.3 m in the first jump.
Then he jumped 0.8 m.
How far did he jump altogether?
- It is 2.1 km to the ski lodge.
Melvin skis 1.7 km.
How much farther has he to go?
- The long side of a rectangle is 4.3 cm.
The short side is 2.8 cm.
How far around the rectangle?

Approximations

Alice bought ski equipment.

skis \$69.75

boots \$73.65

ski poles \$26.75

Approximately how much were the three items? ☹️

Round to the nearest ten dollars.



\$69.75 → \$ 70

\$73.65 → \$ 70

\$26.75 → \$ 30

Approximate total was \$170.

Exercises

Round first to nearest ten dollars. Then approximate the answer.

1. Approximately how much more did Alice pay for the skis than for the poles?
2. Gil bought skates for \$78.65, hockey pads for \$54.85, and 5 hockey sticks for \$32.50. Approximately how much did he pay for the equipment?
3. Approximately how much more did Gil pay for the skates than for the hockey pads?
4. A set of golf clubs cost \$145.75, a golf cart cost \$32.54, and golf shoes cost \$58.23. Approximately how much are the three items?
5. A pair of basketball shoes costs \$22.65, a uniform costs \$16.75, and a basketball costs \$38.50. Approximately how much more do the shoes cost than the uniform?

Tune Up

Round each to the nearest (a) hundred (b) thousand (c) ten thousand.

1. 52 345 2. 37 294 3. 18 091 4. 63 545 5. 11 756

Round to the nearest (a) million (b) ten million.

6. 17 543 211 7. 63 456 754 8. 88 954 329

Using Rounding

On a vacation Franz travelled 1762 km by car and 2341 km by airplane.

Approximately how far did Franz travel in all?

Round to the nearest thousand: 1762 \longrightarrow 2000

2341 \longrightarrow 2000

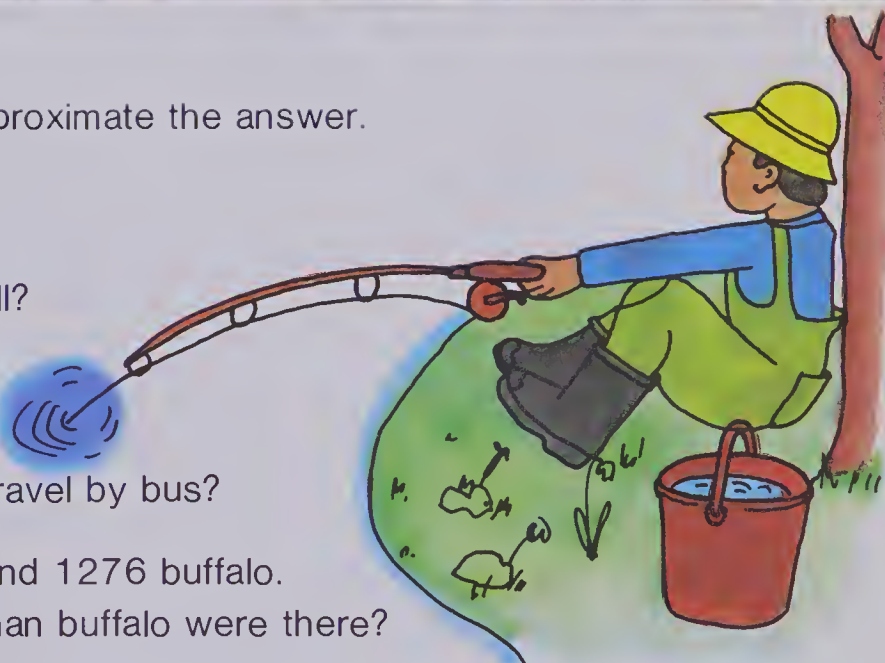
Approximate distance is 4000 km.



Exercises

Round first to the nearest thousand. Then approximate the answer.

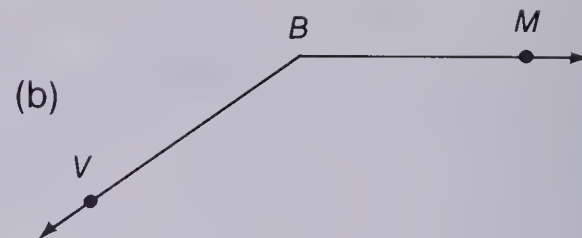
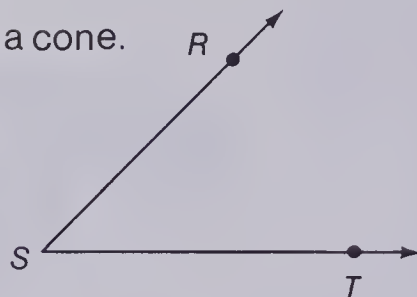
- Betty travelled 2340 km by car.
She travelled 1651 km by airplane.
Approximately how far did she travel in all?
- Horace travelled 2675 km by bus.
He travelled 1811 km by train.
Approximately how much farther did he travel by bus?
- A wildlife officer counted 3756 caribou and 1276 buffalo.
Approximately how many more caribou than buffalo were there?
- The Fish and Game Association planted 15 356 fingerlings in Trout Lake, 27 635 fingerlings in Bow Lake, and 32 399 fingerlings in Rainbow Lake.
Approximately how many fingerlings were planted in all?
- On a round-the-world trip, Lopez flew 18 395 km, travelled by ship 22 675 km, and travelled by bus 17 560 km.
Approximately how far did Lopez travel in all?



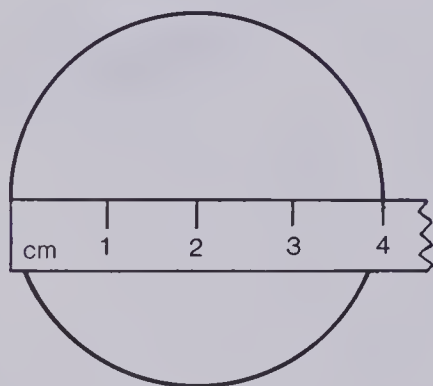
Chapter Test

1. Draw a rectangular prism and a cone.

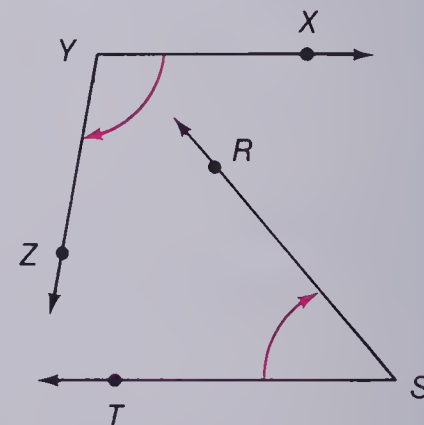
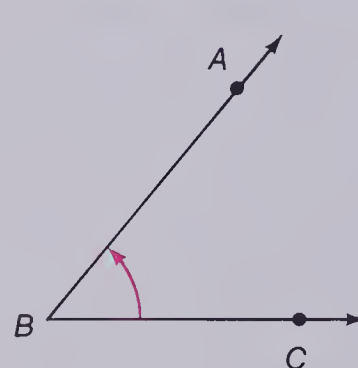
2. Name each angle. (a)



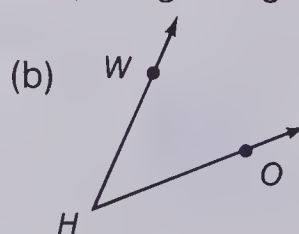
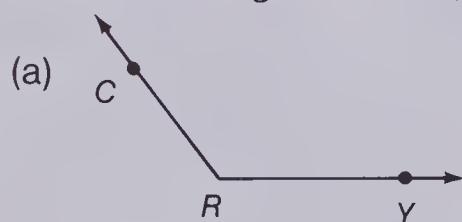
3. Measure the diameter in centimetres.



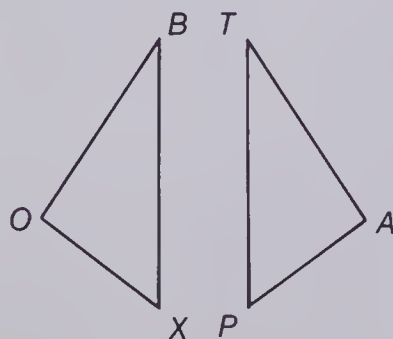
4. Which angle is congruent to $\angle ABC$?



5. Name each angle as acute, obtuse, or right angle.



6. The polygons are congruent.
Name the matching vertices and sides.



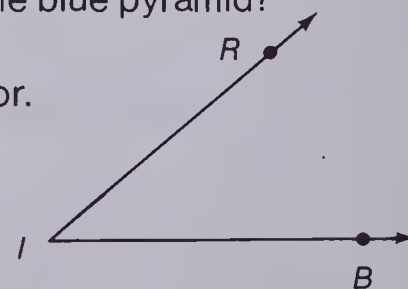
7. Draw a picture for each. Solve.

A red pyramid is 38.4 cm tall.

A blue pyramid is 96.8 cm tall?

How much taller is the blue pyramid?

8. Measure using a protractor.



9. Draw a parallelogram.

Cumulative Review

Compare these numbers. Use $>$, $<$, or $=$.

1. $247.93 \bullet 247.34$

2. $1948.6 \bullet 1942.9$

Round to the nearest tenth.

3. 48.394

4. 0.24

5. 1.752

Round to the nearest hundredth.

6. 12.072

7. 1.445

8. 127.

Add.

9.
$$\begin{array}{r} 0.27 \\ + 1.69 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 43.07 \\ + 19.58 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 472\,898 \\ + 287\,545 \\ \hline \end{array}$$

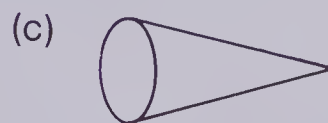
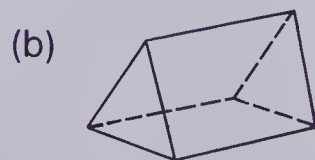
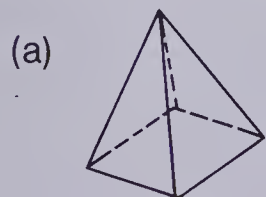
Subtract.

12.
$$\begin{array}{r} 6.09 \\ - 3.27 \\ \hline \end{array}$$

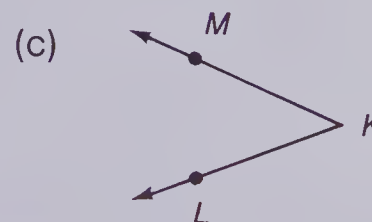
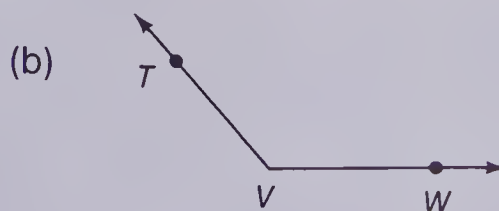
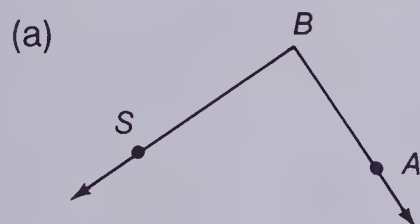
13.
$$\begin{array}{r} 324.48 \\ - 170.52 \\ \hline \end{array}$$

14.
$$\begin{array}{r} 84\,631 \\ - 36\,097 \\ \hline \end{array}$$

15. Name each shape.



16. Name the vertex of each angle.



17. Draw a circle with the radius AB .



18. Draw a cylinder.

Chapter 3

Multiplication

Whole Numbers and Decimals
Estimating



Tune Up

- | | | | | | |
|--|---|--|---|---|---|
| 1. (a) $\begin{array}{r} 5 \\ \times 4 \\ \hline \end{array}$ | (b) $\begin{array}{r} 3 \\ \times 3 \\ \hline \end{array}$ | (c) $\begin{array}{r} 9 \\ \times 1 \\ \hline \end{array}$ | (d) $\begin{array}{r} 0 \\ \times 4 \\ \hline \end{array}$ | (e) $\begin{array}{r} 8 \\ \times 2 \\ \hline \end{array}$ | (f) $\begin{array}{r} 10 \\ \times 3 \\ \hline \end{array}$ |
| 2. (a) $\begin{array}{r} 6 \\ \times 6 \\ \hline \end{array}$ | (b) $\begin{array}{r} 4 \\ \times 9 \\ \hline \end{array}$ | (c) $\begin{array}{r} 1 \\ \times 5 \\ \hline \end{array}$ | (d) $\begin{array}{r} 8 \\ \times 7 \\ \hline \end{array}$ | (e) $\begin{array}{r} 6 \\ \times 4 \\ \hline \end{array}$ | (f) $\begin{array}{r} 7 \\ \times 2 \\ \hline \end{array}$ |
| 3. (a) $\begin{array}{r} 8 \\ \times 8 \\ \hline \end{array}$ | (b) $\begin{array}{r} 10 \\ \times 7 \\ \hline \end{array}$ | (c) $\begin{array}{r} 5 \\ \times 9 \\ \hline \end{array}$ | (d) $\begin{array}{r} 7 \\ \times 7 \\ \hline \end{array}$ | (e) $\begin{array}{r} 10 \\ \times 2 \\ \hline \end{array}$ | (f) $\begin{array}{r} 4 \\ \times 8 \\ \hline \end{array}$ |
| 4. (a) $\begin{array}{r} 7 \\ \times 6 \\ \hline \end{array}$ | (b) $\begin{array}{r} 6 \\ \times 2 \\ \hline \end{array}$ | (c) $\begin{array}{r} 10 \\ \times 10 \\ \hline \end{array}$ | (d) $\begin{array}{r} 5 \\ \times 6 \\ \hline \end{array}$ | (e) $\begin{array}{r} 7 \\ \times 3 \\ \hline \end{array}$ | (f) $\begin{array}{r} 9 \\ \times 9 \\ \hline \end{array}$ |
| 5. (a) $\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$ | (b) $\begin{array}{r} 4 \\ \times 2 \\ \hline \end{array}$ | (c) $\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array}$ | (d) $\begin{array}{r} 8 \\ \times 9 \\ \hline \end{array}$ | (e) $\begin{array}{r} 9 \\ \times 6 \\ \hline \end{array}$ | (f) $\begin{array}{r} 1 \\ \times 1 \\ \hline \end{array}$ |
| 6. (a) $\begin{array}{r} 8 \\ \times 6 \\ \hline \end{array}$ | (b) $\begin{array}{r} 5 \\ \times 3 \\ \hline \end{array}$ | (c) $\begin{array}{r} 4 \\ \times 4 \\ \hline \end{array}$ | (d) $\begin{array}{r} 6 \\ \times 1 \\ \hline \end{array}$ | (e) $\begin{array}{r} 10 \\ \times 5 \\ \hline \end{array}$ | (f) $\begin{array}{r} 3 \\ \times 9 \\ \hline \end{array}$ |
| 7. (a) $\begin{array}{r} 7 \\ \times 5 \\ \hline \end{array}$ | (b) $\begin{array}{r} 2 \\ \times 2 \\ \hline \end{array}$ | (c) $\begin{array}{r} 10 \\ \times 8 \\ \hline \end{array}$ | (d) $\begin{array}{r} 8 \\ \times 0 \\ \hline \end{array}$ | (e) $\begin{array}{r} 9 \\ \times 7 \\ \hline \end{array}$ | (f) $\begin{array}{r} 4 \\ \times 3 \\ \hline \end{array}$ |
| 8. (a) $\begin{array}{r} 6 \\ \times 10 \\ \hline \end{array}$ | (b) $\begin{array}{r} 9 \\ \times 2 \\ \hline \end{array}$ | (c) $\begin{array}{r} 6 \\ \times 3 \\ \hline \end{array}$ | (d) $\begin{array}{r} 10 \\ \times 4 \\ \hline \end{array}$ | (e) $\begin{array}{r} 3 \\ \times 8 \\ \hline \end{array}$ | (f) $\begin{array}{r} 7 \\ \times 4 \\ \hline \end{array}$ |



Tune Up Score Card	
Points	Fitness Report
48 - 43	Excellent condition
42 - 38	Very good condition
37 - 33	Good condition
32 - 28	Fair condition
27 - less	More exercise



1 mark for each correct answer.
How was your Fitness Report?

Special Factors

5	×	10	=	50
factor		factor		product

Kim made these patterns. The second factors are 1, 10, 100, or 1000.

$3 \times 1 = 3$	$25 \times 1 = 25$	$376 \times 1 = 376$
$3 \times 10 = 30$	$25 \times 10 = 250$	$376 \times 10 = 3760$
$3 \times 100 = 300$	$25 \times 100 = 2500$	$376 \times 100 = 37\ 600$
$3 \times 1000 = 3000$	$25 \times 1000 = 25\ 000$	$376 \times 1000 = 376\ 000$

Can you find the pattern?

What rule helps you find the product when multiplying by 1, 10, 100, or 1000?

Exercises

Use your rule to complete this electronic “special-factor” chart.

	×	1	10	100	1000
1.	7			700	
2.	34		340		
3.	156				156 000
4.	18				
5.	3				
★ 6.	50				

Write each product.

- | | | | |
|--------------------------|---------------------------|------------------------|------------------------|
| 7. 39×100 | 8. 17×1 | 9. 8×1000 | 10. 126×10 |
| 11. 852×100 | 12. 3×100 | 13. 87×1000 | 14. 11×100 |
| 15. 28×1 | 16. 742×1000 | 17. 389×100 | 18. 999×10 |
| ★ 19. $6 \times 10\ 000$ | ★ 20. $14 \times 10\ 000$ | ★ 21. 40×1000 | ★ 22. 100×100 |

Patterns with Multiples of 10

Investigate these pattern boards.

$$\begin{array}{rcl} 2 \times 4 & = & 8 \\ 2 \times 40 & = & 80 \\ 2 \times 400 & = & 800 \\ 2 \times 4000 & = & 8000 \end{array}$$

$$\begin{array}{rcl} 3 \times 5 & = & 15 \\ 3 \times 50 & = & 150 \\ 3 \times 500 & = & 1500 \\ 3 \times 5000 & = & 15\,000 \end{array}$$

Can you find the patterns?

What rule helps you find the number of zeros in each product?

Exercises

Use your rule to find the products.

1. (a) 2×3 (b) 2×30 (c) 2×300 (d) 2×3000
2. (a) 4×4 (b) 40×4 (c) 400×4 (d) 4000×4
3. (a) 6×7 (b) 6×70 (c) 6×700 (d) 6×7000

Write each product.

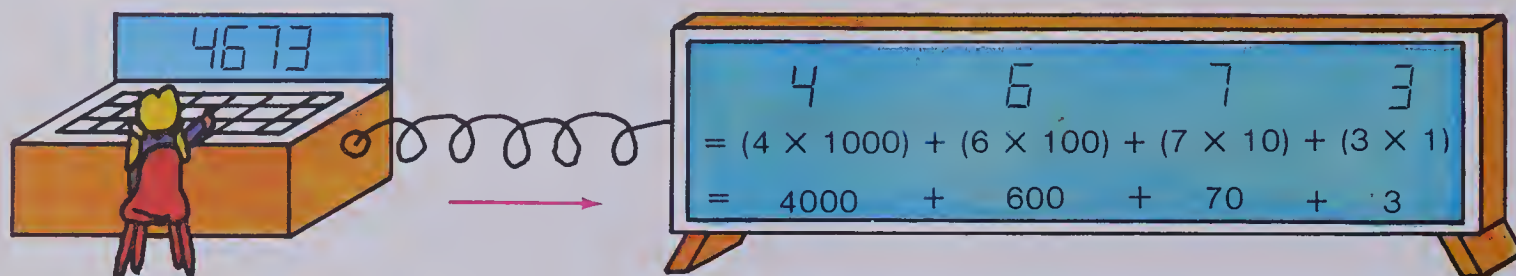
4. $\begin{array}{r} 40 \\ \times 2 \\ \hline \end{array}$
5. $\begin{array}{r} 60 \\ \times 3 \\ \hline \end{array}$
6. $\begin{array}{r} 70 \\ \times 8 \\ \hline \end{array}$
7. $\begin{array}{r} 90 \\ \times 5 \\ \hline \end{array}$
8. $\begin{array}{r} 30 \\ \times 9 \\ \hline \end{array}$
9. $\begin{array}{r} 50 \\ \times 4 \\ \hline \end{array}$
10. $\begin{array}{r} 200 \\ \times 4 \\ \hline \end{array}$
11. $\begin{array}{r} 200 \\ \times 6 \\ \hline \end{array}$
12. $\begin{array}{r} 600 \\ \times 3 \\ \hline \end{array}$
13. $\begin{array}{r} 400 \\ \times 6 \\ \hline \end{array}$
14. $\begin{array}{r} 800 \\ \times 5 \\ \hline \end{array}$
15. $\begin{array}{r} 600 \\ \times 8 \\ \hline \end{array}$
16. $\begin{array}{r} 2000 \\ \times 3 \\ \hline \end{array}$
17. $\begin{array}{r} 4000 \\ \times 8 \\ \hline \end{array}$
18. $\begin{array}{r} 7000 \\ \times 3 \\ \hline \end{array}$
19. $\begin{array}{r} 9000 \\ \times 9 \\ \hline \end{array}$

Solve these mini-stories.

20. About 3 airplanes land and take off every minute at the International Airport. About how many would land and take off in
 - (a) 20 min?
 - (b) 50 min?
 - (c) 70 min?
 - (d) 100 min?
21. About 400 airplanes land and take off every day at another airport. About how many would land and take off in
 - (a) 6 d?
 - (b) 5 d?
 - (c) 8 d?
 - (d) 2 d?

The Expansion Machine

Dr. Morrow has just invented an expansion machine.



The machine writes numbers in **expanded form**.

Exercises

Write these numbers in expanded form.

1. 2708 → $2708 = (2 \times 1000) + (7 \times 100) + (0 \times 10) + (8 \times 1)$
 $= 2000 + 700 + 0 + 8$

2. 8241

3. 6504

4. 259

5. 3218

6. 47

7. 7526

8. 9047

9. 830

10. 2606

11. 8174

12. 152

13. 7634

14. 6053

★ 15. 3030

★ 16. 5555

Write each as a numeral.

17. $(4 \times 1000) + (7 \times 100) + (6 \times 10) + (2 \times 1)$

18. $3000 + 500 + 0 + 9$

19. $600 + 30 + 4$

20. $(7 \times 100) + (2 \times 10) + (0 \times 1)$

21. $(3 \times 1000) + (8 \times 100) + (0 \times 10) + 5$

22. $9000 + 0 + 50 + 6$

23. $(7 \times 10) + (3 \times 1)$

24. $5000 + 700 + 70 + 0$

Write the expanded form for each underlined digit.

25. $4\underline{6}25 \rightarrow (6 \times 100) = 600$

26. $5\underline{2}3$

27. $\underline{8}728$

28. $36\underline{0}9$

29. $\underline{5}728$

30. $\underline{2}94$

31. $57\underline{0}$

32. $7\underline{1}46$

33. $49\underline{1}2$

Marching Bands

How many musicians
in the marching band?

The Fenton City Marching Band

6 rows of
musicians

23 musicians in each row

We can use the *short form*.

Step 1 $\begin{array}{r} 1 \leftarrow \text{Write 1 here} \\ \text{meaning 1 ten.} \\ 23 \\ \times 6 \\ \hline \end{array}$ (6 \times 3 = 18)
8 Write 8

Step 2 $\begin{array}{r} 1 \\ 23 \\ \times 6 \\ \hline \end{array}$ (6 \times 2 tens = 12 tens)
Add 1 ten. \rightarrow 1 ten
138 Write 13 13 tens

There are 138 musicians in the marching band.

We can use:

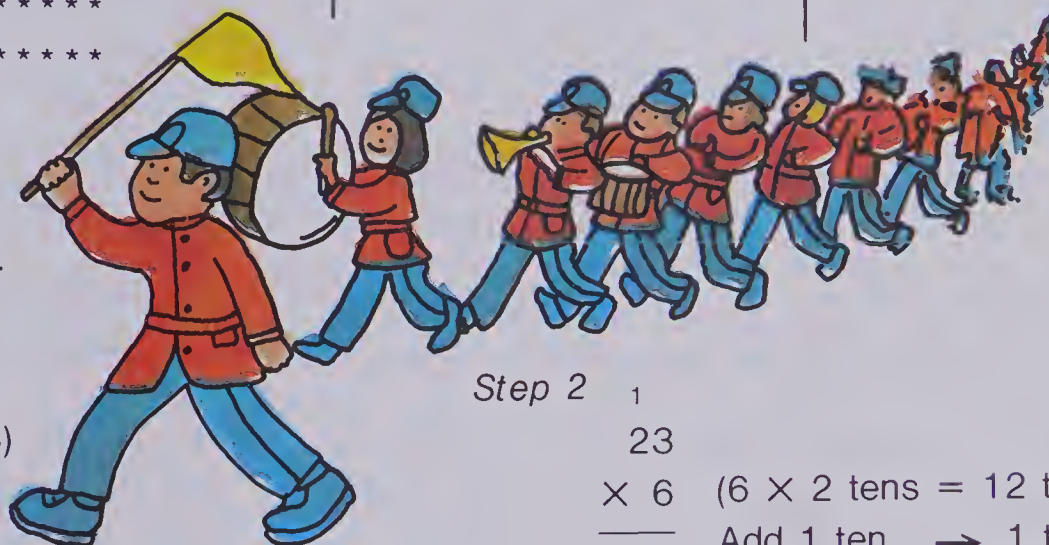
Expanded form

Think of 23 as 20 + 3.

$$\begin{array}{r} 20 + 3 \\ \times \quad 6 \\ \hline 120 + 18 = 138 \end{array}$$

Column form

$$\begin{array}{r} 23 \\ \times 6 \\ \hline 18 \rightarrow (6 \times 3) \\ 120 \rightarrow (6 \times 20) \\ \hline 138 \end{array}$$



Exercises

Multiply.

1. $\begin{array}{r} 35 \\ \times 7 \\ \hline \end{array}$

2. $\begin{array}{r} 46 \\ \times 3 \\ \hline \end{array}$

3. $\begin{array}{r} 50 \\ \times 9 \\ \hline \end{array}$

4. $\begin{array}{r} 38 \\ \times 5 \\ \hline \end{array}$

5. $\begin{array}{r} 68 \\ \times 6 \\ \hline \end{array}$

6. $\begin{array}{r} 29 \\ \times 9 \\ \hline \end{array}$

7. $\begin{array}{r} 18 \\ \times 3 \\ \hline \end{array}$

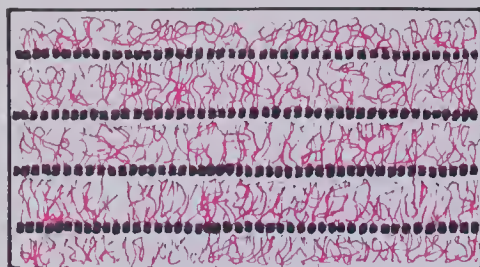
8. $\begin{array}{r} 70 \\ \times 6 \\ \hline \end{array}$

9. $\begin{array}{r} 86 \\ \times 2 \\ \hline \end{array}$

10. $\begin{array}{r} 25 \\ \times 5 \\ \hline \end{array}$

11. $\begin{array}{r} 30 \\ \times 8 \\ \hline \end{array}$

12. $\begin{array}{r} 44 \\ \times 7 \\ \hline \end{array}$



4 rows
of cells

368 cells in each row

Micro Cells

Conrad makes micro cells in
the Benton Laboratory.

How many micro cells did Conrad
make altogether?

$$\begin{array}{r} \text{Find} \quad 368 \\ \times 4 \\ \hline \end{array}$$

We can use the *short form*.

Step 1

$$\begin{array}{r} 368 \\ \times 4 \quad (4 \times 8 = 32 \text{ ones}) \\ \hline \end{array}$$

Write 3 here meaning 3 tens

2 Write 2

Step 3

$$\begin{array}{r} 368 \quad (4 \times 3 \text{ hundreds} = 12 \text{ hundreds}) \\ \times 4 \\ \hline \end{array}$$

Add. 2 hundreds

14 hundreds

1472 Write 14

Step 2

$$\begin{array}{r} 23 \\ 368 \\ \times 4 \quad (4 \times 6 \text{ tens} = 24 \text{ tens}) \\ \hline \end{array}$$

Write 2 here meaning 2 hundreds

Add. 3 tens

27 tens

Write 7

Conrad made 1472 micro cells altogether.

Exercises

Multiply. Use the short form.

1. $\begin{array}{r} 427 \\ \times 6 \\ \hline \end{array}$
2. $\begin{array}{r} 723 \\ \times 8 \\ \hline \end{array}$
3. $\begin{array}{r} 175 \\ \times 5 \\ \hline \end{array}$
4. $\begin{array}{r} 283 \\ \times 7 \\ \hline \end{array}$
5. $\begin{array}{r} 393 \\ \times 4 \\ \hline \end{array}$
6. $\begin{array}{r} 510 \\ \times 8 \\ \hline \end{array}$
7. $\begin{array}{r} 930 \\ \times 5 \\ \hline \end{array}$
8. $\begin{array}{r} 415 \\ \times 9 \\ \hline \end{array}$
9. $\begin{array}{r} 707 \\ \times 5 \\ \hline \end{array}$
10. $\begin{array}{r} 408 \\ \times 3 \\ \hline \end{array}$
11. $\begin{array}{r} 924 \\ \times 7 \\ \hline \end{array}$
- ★ 12. $\begin{array}{r} 9109 \\ \times 4 \\ \hline \end{array}$
- ★ 13. $\begin{array}{r} 9109 \\ \times 5 \\ \hline \end{array}$
- ★ 14. $\begin{array}{r} 9109 \\ \times 6 \\ \hline \end{array}$
- ★ 15. $\begin{array}{r} 9109 \\ \times 7 \\ \hline \end{array}$

Solve.

16. 9 rows of cells.
543 cells in each row.
How many cells altogether?

17. 7 rows of cells.
684 cells in each row.
How many cells altogether?



Crivets

Kami makes crivets for the Fielding Company.

6 cases of crivets.

4786 crivets in each case.

How many crivets altogether?

Find

$$\begin{array}{r} 4786 \\ \times 6 \\ \hline \end{array}$$

Can you explain each step?

Step 1 ³

$$\begin{array}{r} 4786 \\ \times 6 \\ \hline 6 \end{array}$$

Step 2 ^{5 3}

$$\begin{array}{r} 4786 \\ \times 6 \\ \hline 16 \end{array}$$

Step 3 ^{4 5 3}

$$\begin{array}{r} 4786 \\ \times 6 \\ \hline 716 \end{array}$$

Step 4 ^{4 5 3}

$$\begin{array}{r} 4786 \\ \times 6 \\ \hline 28 \ 716 \end{array}$$

There are 28 716 crivets altogether.

Exercises

Multiply.

1. ³

$$\begin{array}{r} 5376 \\ \times 4 \\ \hline \end{array}$$

2. ²

$$\begin{array}{r} 4875 \\ \times 5 \\ \hline \end{array}$$

3. ¹

$$\begin{array}{r} 2183 \\ \times 8 \\ \hline \end{array}$$

4. ¹

$$\begin{array}{r} 3657 \\ \times 6 \\ \hline \end{array}$$

5. ²

$$\begin{array}{r} 4204 \\ \times 7 \\ \hline \end{array}$$

6. ¹

$$\begin{array}{r} 9064 \\ \times 3 \\ \hline \end{array}$$

7. ¹

$$\begin{array}{r} 6423 \\ \times 9 \\ \hline \end{array}$$

8. ¹

$$\begin{array}{r} 4738 \\ \times 2 \\ \hline \end{array}$$

Multiply these larger numbers. Watch each step.

9. ²

$$\begin{array}{r} 37 \ 148 \\ \times 6 \\ \hline \end{array}$$

10. ¹

$$\begin{array}{r} 62 \ 475 \\ \times 5 \\ \hline \end{array}$$

11. ¹

$$\begin{array}{r} 54 \ 917 \\ \times 3 \\ \hline \end{array}$$

12. ¹

$$\begin{array}{r} 42 \ 856 \\ \times 8 \\ \hline \end{array}$$

13. ²

$$\begin{array}{r} 70 \ 346 \\ \times 2 \\ \hline \end{array}$$

14. ¹

$$\begin{array}{r} 16 \ 807 \\ \times 7 \\ \hline \end{array}$$

15. ¹

$$\begin{array}{r} 29 \ 366 \\ \times 4 \\ \hline \end{array}$$

16. ¹

$$\begin{array}{r} 85 \ 623 \\ \times 9 \\ \hline \end{array}$$

★ 17. ²

$$\begin{array}{r} 999 \ 999 \\ \times 3 \\ \hline \end{array}$$

★ 18. ¹

$$\begin{array}{r} 999 \ 999 \\ \times 4 \\ \hline \end{array}$$

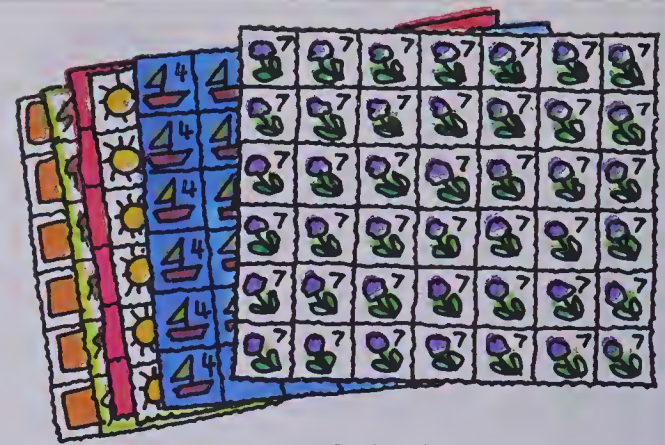
★ 19. ¹

$$\begin{array}{r} 999 \ 999 \\ \times 5 \\ \hline \end{array}$$

★ 20. ¹

$$\begin{array}{r} 999 \ 999 \\ \times 6 \\ \hline \end{array}$$

Estimation



Jamie bought 6 sheets of stamps from interesting countries. Each sheet has 42 stamps. How many stamps did Jamie buy altogether?

Estimate:
 6×42

then

Calculate:

Jamie writes:

$$\begin{array}{r} 42 \\ \times 6 \\ \hline 252 \end{array}$$

Jamie rounds the greater.

He thinks: $6 \times 40 = 240$

About 240 stamps.

252 stamps.

Jamie bought 252 stamps.

Is Jamie's written answer reasonable?

An **estimate** helps tell whether a calculated answer is reasonable.

Exercises

Copy and complete these estimates.

Think:

To estimate:

1. $3 \times 56 \longrightarrow 3 \times 60 = \blacksquare$
2. $7 \times 236 \longrightarrow 7 \times 200 = \blacksquare$
3. $4 \times 71 \longrightarrow 4 \times \blacksquare = \blacksquare$
4. $6 \times 387 \longrightarrow 6 \times \blacksquare = \blacksquare$
5. $8 \times 4163 \longrightarrow 8 \times 4000 = \blacksquare$
6. $7 \times 5921 \longrightarrow 7 \times \blacksquare = \blacksquare$



Estimate, then calculate. Are your calculated answers reasonable?

- | | | | | |
|--|--|--|--|--|
| 7. $\begin{array}{r} 47 \\ \times 8 \\ \hline \end{array}$ | 8. $\begin{array}{r} 34 \\ \times 6 \\ \hline \end{array}$ | 9. $\begin{array}{r} 65 \\ \times 4 \\ \hline \end{array}$ | 10. $\begin{array}{r} 73 \\ \times 9 \\ \hline \end{array}$ | 11. $\begin{array}{r} 28 \\ \times 2 \\ \hline \end{array}$ |
| 12. $\begin{array}{r} 864 \\ \times 3 \\ \hline \end{array}$ | 13. $\begin{array}{r} 510 \\ \times 5 \\ \hline \end{array}$ | 14. $\begin{array}{r} 195 \\ \times 9 \\ \hline \end{array}$ | 15. $\begin{array}{r} 481 \\ \times 7 \\ \hline \end{array}$ | 16. $\begin{array}{r} 629 \\ \times 6 \\ \hline \end{array}$ |

Thinking About Addition

Linda thinks about addition to help with multiplication!



$$\begin{array}{r} 0.5 \\ \times 3 \\ \hline ? \end{array}$$



Addition

$$\begin{array}{r} 0.5 \\ 0.5 \\ + 0.5 \\ \hline 1.5 \end{array}$$



Multiplication

$$\begin{array}{r} 1 \\ 0.5 \\ \times 3 \\ \hline 1.5 \end{array}$$

$$\begin{array}{r} 1.7 \\ \times 2 \\ \hline ? \end{array}$$



$$\begin{array}{r} 1.7 \\ + 1.7 \\ \hline 3.4 \end{array}$$



$$\begin{array}{r} 1 \\ 1.7 \\ \times 2 \\ \hline 3.4 \end{array}$$

Exercises

Copy and complete.

1.
$$\begin{array}{r} 0.6 \\ \times 2 \\ \hline ? \end{array}$$



$$\begin{array}{r} 0.6 \\ + 0.6 \\ \hline \square.\square \end{array}$$



$$\begin{array}{r} 0.6 \\ \times 2 \\ \hline \square.\square \end{array}$$

2.
$$\begin{array}{r} 0.9 \\ \times 3 \\ \hline ? \end{array}$$



$$\begin{array}{r} 0.9 \\ \square.\square \\ + \square.\square \\ \hline \square.\square \end{array}$$



$$\begin{array}{r} 0.9 \\ \times 3 \\ \hline \square.\square \end{array}$$

3.
$$\begin{array}{r} 1.4 \\ \times 3 \\ \hline ? \end{array}$$



$$\begin{array}{r} 1.4 \\ 1.4 \\ + 1.4 \\ \hline \square.\square \end{array}$$



$$\begin{array}{r} 1.4 \\ \times 3 \\ \hline \square.\square \end{array}$$

4.
$$\begin{array}{r} 2.6 \\ \times 2 \\ \hline ? \end{array}$$



$$\begin{array}{r} 2.6 \\ \square.\square \\ + \square.\square \\ \hline \square.\square \end{array}$$



$$\begin{array}{r} 2.6 \\ \times 2 \\ \hline \square.\square \end{array}$$

Multiply. Think about addition to help.

5.
$$\begin{array}{r} 0.7 \\ \times 2 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 0.4 \\ \times 3 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 0.3 \\ \times 5 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 0.6 \\ \times 3 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 0.7 \\ \times 3 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 1.6 \\ \times 2 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 1.9 \\ \times 3 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 2.5 \\ \times 3 \\ \hline \end{array}$$

13.
$$\begin{array}{r} 6.3 \\ \times 4 \\ \hline \end{array}$$

★ 14.
$$\begin{array}{r} 2.5 \\ \times 4 \\ \hline \end{array}$$

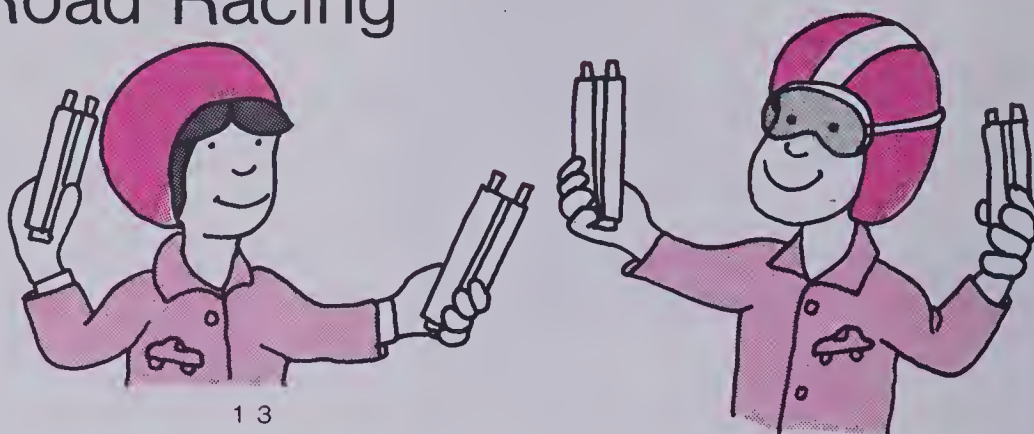
Road Racing

Ron and Mary Ann like to build tracks for their road racing set.

Ron put together 4 pieces of track.

Each piece is 23.9 cm long.

How long is the total section of track?



Multiply as you would with whole numbers.

Estimate:

$$4 \times 20 = 80$$

$$\begin{array}{r} 13 \\ 23.9 \\ \times 4 \\ \hline 95.6 \end{array}$$

One decimal place in this factor.
No decimal places in this factor.
One decimal place in the product.

The section is 95.6 cm long.

Exercises

Write your estimate. Calculate the exact answer.

1.
$$\begin{array}{r} 37.2 \\ \times 6 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 40.7 \\ \times 3 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 52.1 \\ \times 8 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 65.0 \\ \times 4 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 86.4 \\ \times 2 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 28.6 \\ \times 7 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 40.1 \\ \times 9 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 72.3 \\ \times 5 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 97.4 \\ \times 3 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 18.2 \\ \times 4 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 35.2 \\ \times 8 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 83.7 \\ \times 6 \\ \hline \end{array}$$

13.
$$\begin{array}{r} 60.8 \\ \times 2 \\ \hline \end{array}$$

14.
$$\begin{array}{r} 24.6 \\ \times 7 \\ \hline \end{array}$$

15.
$$\begin{array}{r} 35.5 \\ \times 5 \\ \hline \end{array}$$

16.
$$\begin{array}{r} 76.3 \\ \times 4 \\ \hline \end{array}$$

Solve these mini-problems.

17. 6 pieces of track.

Each piece is 39.9 cm long.

How long is total section?

18. 5 pieces of track.

Each piece is 50.2 cm long.

How long is total section?

Fairway Hotel

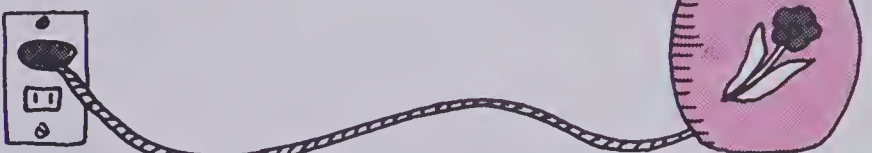
The hotel manager is buying new furniture for the lobby.

He bought 5 table lamps.

Each cost \$47.35.

What is the total cost?





$$\begin{array}{r} 312 \\ 47.35 \\ \times \quad 5 \\ \hline \end{array}$$

How many decimal places in the factors?

Multiply as you would with whole numbers.

Estimate:
 $5 \times 50 = 250.$

$$236.75$$

How many decimal places in the product?

The total cost is \$236.75.

Exercises

Multiply.

1. $\begin{array}{r} \$2.45 \\ \times \quad 4 \\ \hline \end{array}$

2. $\begin{array}{r} \$4.90 \\ \times \quad 3 \\ \hline \end{array}$

3. $\begin{array}{r} \$6.05 \\ \times \quad 5 \\ \hline \end{array}$

4. $\begin{array}{r} \$3.29 \\ \times \quad 7 \\ \hline \end{array}$

5. $\begin{array}{r} \$62.34 \\ \times \quad 4 \\ \hline \end{array}$

6. $\begin{array}{r} \$25.98 \\ \times \quad 3 \\ \hline \end{array}$

7. $\begin{array}{r} \$40.15 \\ \times \quad 6 \\ \hline \end{array}$

8. $\begin{array}{r} \$83.60 \\ \times \quad 5 \\ \hline \end{array}$

9. $\begin{array}{r} \$104.29 \\ \times \quad 5 \\ \hline \end{array}$

10. $\begin{array}{r} \$420.73 \\ \times \quad 2 \\ \hline \end{array}$

11. $\begin{array}{r} \$153.68 \\ \times \quad 3 \\ \hline \end{array}$

12. $\begin{array}{r} \$398.05 \\ \times \quad 7 \\ \hline \end{array}$

13. $\begin{array}{r} 506.10 \\ \times \quad 8 \\ \hline \end{array}$

14. $\begin{array}{r} 726.40 \\ \times \quad 6 \\ \hline \end{array}$

15. $\begin{array}{r} 499.09 \\ \times \quad 4 \\ \hline \end{array}$

16. $\begin{array}{r} 815.25 \\ \times \quad 7 \\ \hline \end{array}$

Find the cost for this hotel furniture.

17. 2 wall hangings.
\$99.67 each.

18. 3 planters.
\$80.49 each.

19. 5 paintings.
\$136.25 each.

★ 23. Find the total cost of the furniture.

20. 3 large rugs.
\$359.08 each.

21. 9 coffee tables.
\$274.85 each.

22. 6 sofas.
\$635.99 each.

Spring Inventory

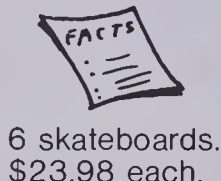
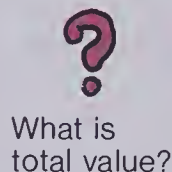
Mr. Franklin is checking his stock for spring.

6 "Super Form" skateboards.

Each costs \$23.98.

What is the total value of the skateboards?

Step 1. Find answers to Professor Q's four questions.



Step 2. Write a number sentence to fit the problem.

$$6 \times 23.98 = \boxed{N}$$

Step 3. Make the sentence true. $6 \times 23.98 = 143.88$

Step 4. The total value of the skateboards is \$143.88.



Exercises

1. 7 sleeping bags.

\$36.95 each.

What is the total value?

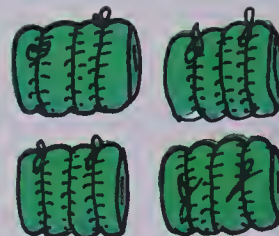
(a) Answer Professor Q's four questions.

(b) Choose the number sentence that fits the problem.

(i) $36.95 \div 7 = \boxed{N}$ (ii) $\boxed{N} \times 7 = 36.95$ (iii) $7 \times 36.95 = \boxed{N}$

(c) Make the sentence true.

(d) Write a statement.



2. 8 large crates.

32 boxes of grass seed in each crate.

How many boxes of grass seed altogether?

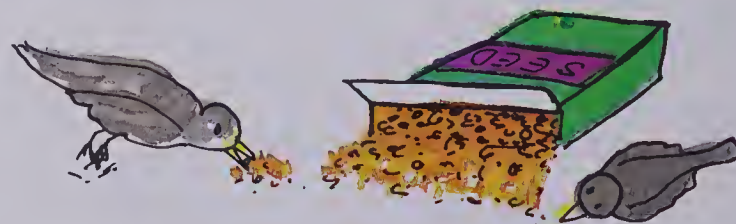
(a) Answer Professor Q's four questions.

(b) Choose the number sentence that fits the problem.

(i) $8 \times \boxed{N} = 32$ (ii) $8 \times 32 = \boxed{N}$ (iii) $32 \div \boxed{N} = 8$

(c) Make the sentence true.

(d) Write a statement.



For each of the following:

- (a) Answer Professor Q's four questions *mentally*.
- (b) Write a number sentence to fit the problem.
- (c) Make the sentence true.
- (d) Write a statement.

3. 3 propane Bar-B-Q's.
\$179.85 each.
What is the total value?

4. 24 cases of house paint.
9 cans in each case.
How many cans of house paint altogether?

5. 4 outboard motors.
\$465.79 each.
What is the total value?

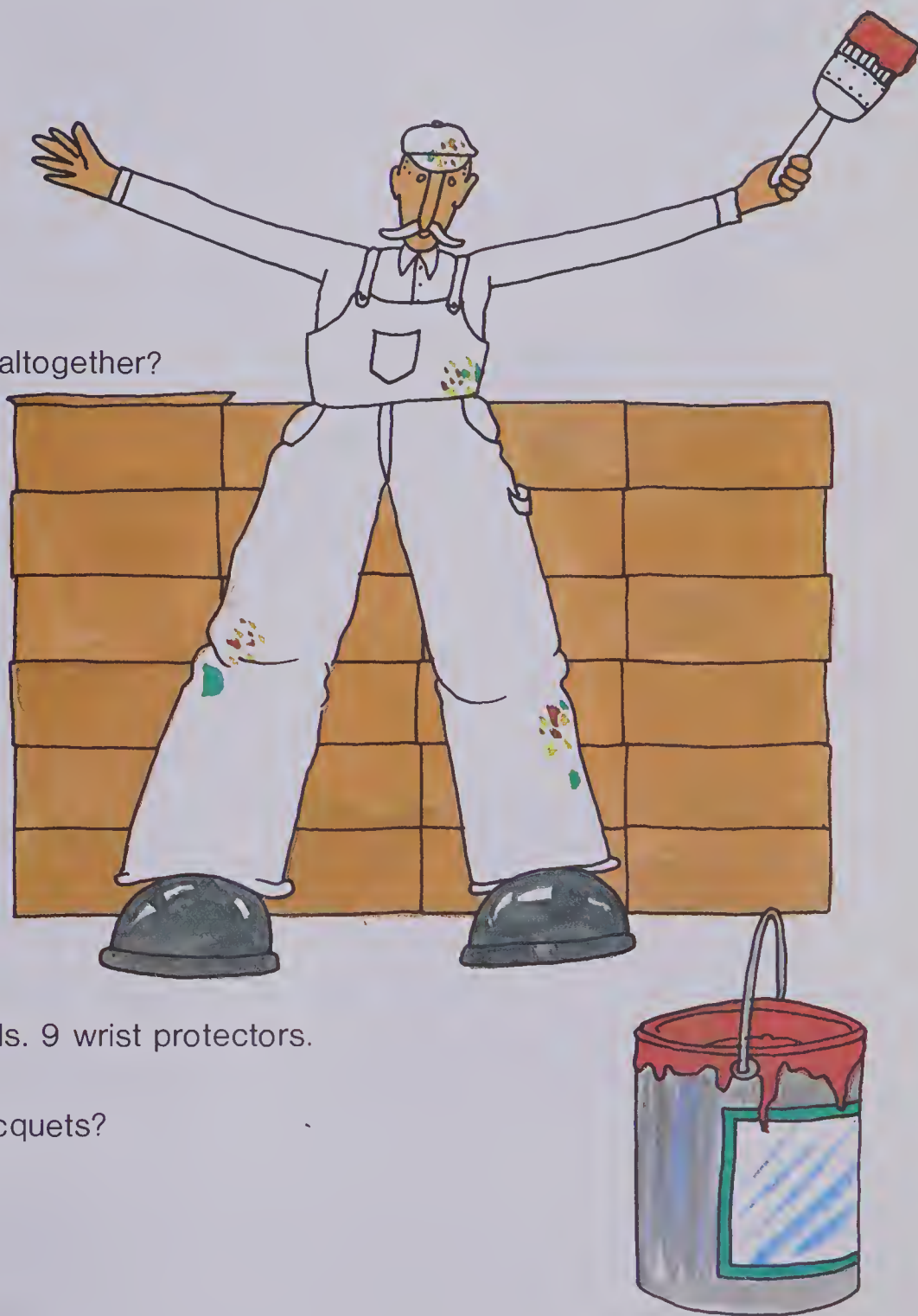
6. 6 five-speed bikes.
\$110.00 each.
What is the total value?

7. 5 archery sets.
\$68.45 each.
What is the total value?

8. 5 cartons of tent patch kits.
255 kits in each carton.
How many kits altogether?

★ 9. 8 tennis racquets. 14 tennis balls. 9 wrist protectors.
\$12.09 for each racquet.
What is the total value of the racquets?

★ 10. 9 cases of pool cleaner tablets.
\$84.79 for each case.
3047 tablets in each case.
How many tablets altogether?



Engine Parts

A machinist is making parts for some airplane engines.



Five bearings are machined to fit next to each other.

Each bearing is 1.235 cm wide.

What is the total width of the five bearings?

$$\begin{array}{r} 1\ 2 \\ 1.235 \\ \times \quad 5 \\ \hline 6.175 \end{array}$$

The total width is 6.175 cm.

Exercises

Multiply to find the size of these engine parts.

1. 1.413×6

2. 2.015×3

3. 2.827×5

4. 1.206×9

5. 3.158×4

6. 2.066×7

Multiply.

7.
$$\begin{array}{r} 5.417 \\ \times \quad 3 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 6.059 \\ \times \quad 4 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 4.117 \\ \times \quad 6 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 3.909 \\ \times \quad 5 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 7.251 \\ \times \quad 8 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 4.905 \\ \times \quad 6 \\ \hline \end{array}$$

13.
$$\begin{array}{r} 8.236 \\ \times \quad 2 \\ \hline \end{array}$$

14.
$$\begin{array}{r} 5.801 \\ \times \quad 7 \\ \hline \end{array}$$

15.
$$\begin{array}{r} 9.151 \\ \times \quad 8 \\ \hline \end{array}$$

16.
$$\begin{array}{r} 3.999 \\ \times \quad 2 \\ \hline \end{array}$$

17.
$$\begin{array}{r} 6.006 \\ \times \quad 4 \\ \hline \end{array}$$

18.
$$\begin{array}{r} 7.532 \\ \times \quad 9 \\ \hline \end{array}$$

Solve.

19. 7 bearings.

Each one is 1.088 cm thick.

How thick altogether?

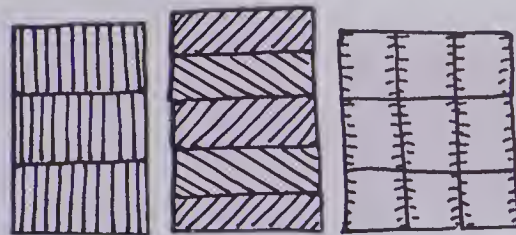
20. 9 steel plates.

Each one is 2.101 cm thick.

How thick altogether?

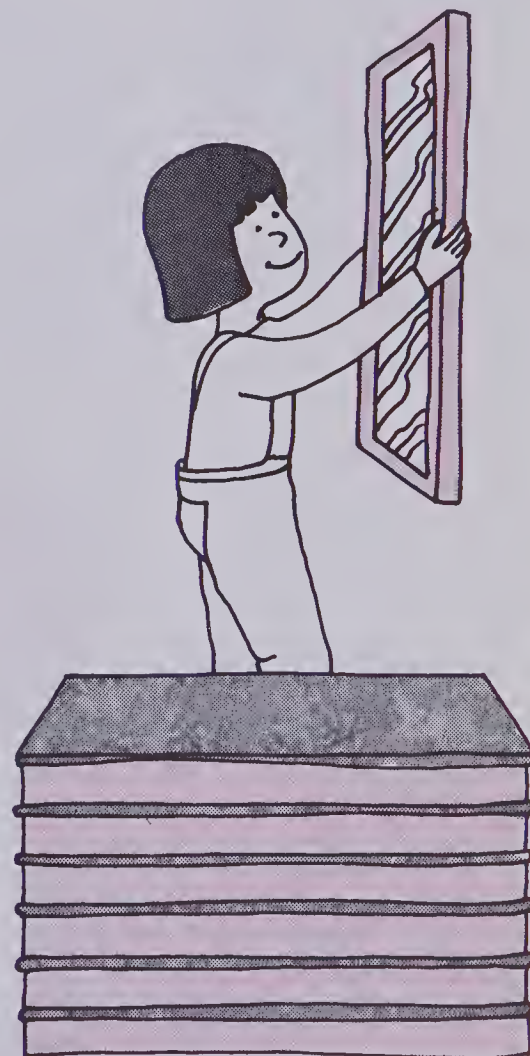
Warehouse Stacks

Supplies are neatly stacked in a warehouse until they are needed.



Exercises

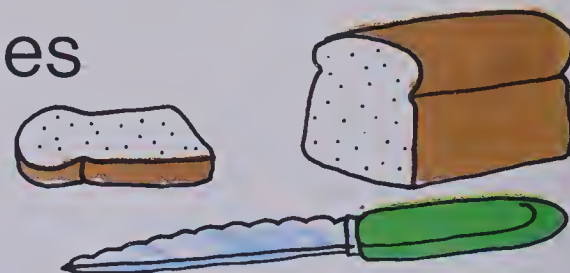
1. Some house bricks are 5.315 cm thick.
Rob stacked these bricks in a pile 8 bricks high.
How high was the pile of bricks?
2. Some ceiling tile is 2.019 cm thick.
Bill stacked the tiles in piles of 6.
How high was each pile?
3. Susan is storing some "How to Build a House" books.
Each book is 5.107 cm thick.
She put 9 books in each pile.
How high is each stack of building books?
4. Bruce is stacking 4 boxes of nails in each pile.
Each box has a mass of 5.145 kg.
What is the total mass of each pile?
5. Five wood planks are piled neatly in a stack.
Each plank is 3.924 cm thick.
How high is the stack?
- ★ 6. In one corner there are 8 cement blocks in a stack.
Each block is 21.395 cm thick.
How high is the stack?
- ★ 7. Freda is helping to stack some livingroom mirrors which are 4.625 mm thick.
Between each mirror she places cardboard which is 1.703 mm thick.
How high is a pile of 7 mirrors including the cardboard?



Counting Kilojoules

There are about 300 kJ in one slice of white bread.

Physical activity burns up kilojoules (kJ).



How many kilojoules in

- (a) 5 slices? (b) 10 slices? (c) 50 slices?
(d) 200 slices? (e) 800 slices?

$$\begin{array}{r} (a) \quad 300 \\ \times \quad 5 \\ \hline 1500 \end{array}$$

$$\begin{array}{r} (b) \quad 300 \text{ } ^3 \text{ zeros} \\ \times \quad 10 \\ \hline 3000 \\ \text{ } ^3 \text{ zeros} \end{array}$$

$$\begin{array}{r} (c) \quad 300 \\ \times \quad 50 \\ \hline 15\,000 \end{array}$$

$$\begin{array}{r} (d) \quad 300 \text{ } ^4 \text{ zeros} \\ \times \quad 200 \\ \hline 60\,000 \\ \text{ } ^4 \text{ zeros} \end{array}$$

$$\begin{array}{r} (e) \quad 300 \\ \times \quad 800 \\ \hline 240\,000 \end{array}$$

Exercises

1. A medium-sized orange has about 200 kJ.

How many kilojoules in

- (a) 5 oranges?
(b) 20 oranges?
(c) 60 oranges?
(d) 100 oranges?
(e) 300 oranges?

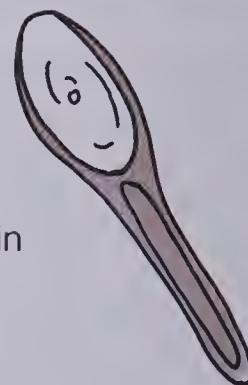


2. Mrs. Sherridan uses one spoonful of creamer in every cup of coffee.

If the creamer contained

40 kJ, how many kilojoules in

- (a) 5 cups of coffee?
(b) 10 cups of coffee?
(c) 40 cups of coffee?
(d) 100 cups of coffee?
(e) 600 cups of coffee?



3. Most cupcakes contain about 800 kJ.

How many kilojoules in

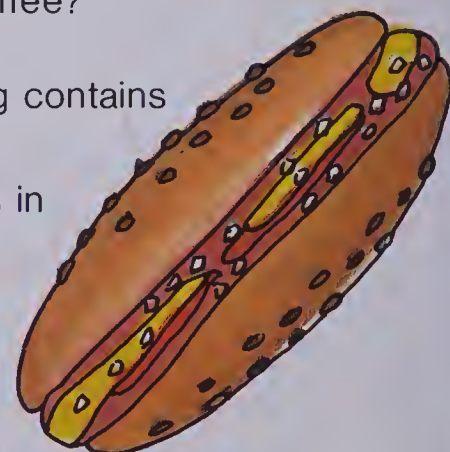
- (a) 8 cupcakes?
(b) 30 cupcakes?
(c) 90 cupcakes?
(d) 100 cupcakes?
(e) 500 cupcakes?



4. The average hot dog contains about 1000 kJ.

How many kilojoules in

- (a) 5 hot dogs?
(b) 20 hot dogs?
(c) 80 hot dogs?
(d) 200 hot dogs?
(e) 400 hot dogs?



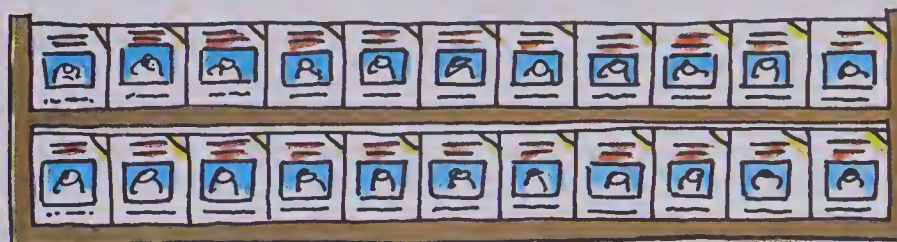
Supermarket Sale

Ultra-White detergent is on sale.

78 cases.

32 boxes of detergent in each case.

How many boxes altogether?



Multiply by ones.



$$\begin{array}{r} 78 \\ \times 32 \\ \hline 156 \end{array} \quad (2 \times 78)$$

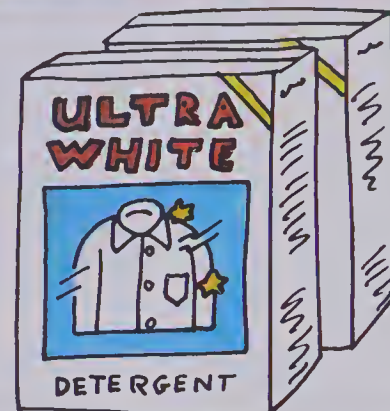
Multiply by tens.



$$\begin{array}{r} 78 \\ \times 32 \\ \hline 156 \\ 2340 \end{array} \quad (30 \times 78)$$

Add.

$$\begin{array}{r} 78 \\ \times 32 \\ \hline 156 \\ 2340 \\ \hline 2496 \end{array}$$



There are 2496 boxes altogether.

Exercises

Complete.

1. $\begin{array}{r} 37 \\ \times 25 \\ \hline \end{array}$

■■■ (5 × 37)

. 740 (20 × 37)

925

2. $\begin{array}{r} 43 \\ \times 38 \\ \hline \end{array}$

344 (8 × 43)

■■■■ (30 × 43)

■■■■

3. $\begin{array}{r} 50 \\ \times 19 \\ \hline \end{array}$

■■■ (■ × ■■)

■■■ (10 × 50)

950

Multiply.

4. $\begin{array}{r} 62 \\ \times 18 \\ \hline \end{array}$

5. $\begin{array}{r} 74 \\ \times 23 \\ \hline \end{array}$

6. $\begin{array}{r} 30 \\ \times 15 \\ \hline \end{array}$

7. $\begin{array}{r} 28 \\ \times 21 \\ \hline \end{array}$

8. $\begin{array}{r} 56 \\ \times 35 \\ \hline \end{array}$

9. $\begin{array}{r} 92 \\ \times 41 \\ \hline \end{array}$

10. $\begin{array}{r} 45 \\ \times 25 \\ \hline \end{array}$

11. $\begin{array}{r} 67 \\ \times 43 \\ \hline \end{array}$

12. $\begin{array}{r} 70 \\ \times 28 \\ \hline \end{array}$

13. $\begin{array}{r} 20 \\ \times 36 \\ \hline \end{array}$

★ 14. $\begin{array}{r} 37 \\ \times 21 \\ \hline \end{array}$

★ 15. $\begin{array}{r} 37 \\ \times 12 \\ \hline \end{array}$

★ 16. $\begin{array}{r} 37 \\ \times 18 \\ \hline \end{array}$

★ 17. $\begin{array}{r} 37 \\ \times 15 \\ \hline \end{array}$

★ 18. $\begin{array}{r} 37 \\ \times 24 \\ \hline \end{array}$

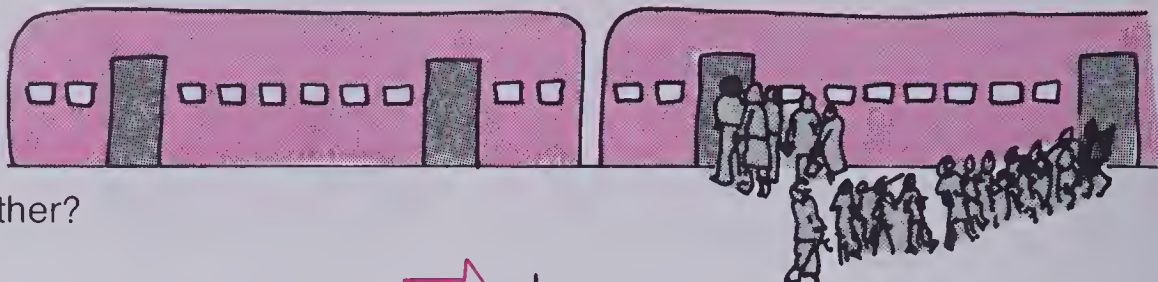
City Subway

Rush Hour!!

46 trips.

743 passengers for each trip.

How many passengers altogether?



Multiply by ones.



Multiply by tens.



Add.

$$\begin{array}{r} 743 \\ \times 46 \\ \hline 4458 \end{array} \quad (6 \times 743)$$

$$\begin{array}{r} 743 \\ \times 46 \\ \hline 4458 \\ 29720 \end{array} \quad (40 \times 743)$$

$$\begin{array}{r} 743 \\ \times 46 \\ \hline 4458 \\ 29720 \\ \hline 34178 \end{array}$$



There were 34 178 passengers altogether.

Exercises

Complete.

$$\begin{array}{r} 1. \quad 472 \\ \times 36 \\ \hline \blacksquare \blacksquare \blacksquare \blacksquare \quad (6 \times 472) \\ 14160 \quad (30 \times 472) \\ \hline 16992 \end{array}$$

$$\begin{array}{r} 2. \quad 293 \\ \times 53 \\ \hline 879 \quad (3 \times 293) \\ \blacksquare \blacksquare \blacksquare \blacksquare \quad (50 \times 293) \\ \hline \blacksquare \blacksquare \blacksquare \blacksquare \end{array}$$

$$\begin{array}{r} 3. \quad 504 \\ \times 67 \\ \hline 3528 \quad (\blacksquare \times \blacksquare \blacksquare \blacksquare) \\ \blacksquare \blacksquare \blacksquare \blacksquare \quad (60 \times 504) \\ \hline \blacksquare \blacksquare \blacksquare \blacksquare \end{array}$$

Multiply.

$$\begin{array}{r} 4. \quad 326 \\ \times 24 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 407 \\ \times 32 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 812 \\ \times 16 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 281 \\ \times 26 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 540 \\ \times 12 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 367 \\ \times 35 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 721 \\ \times 47 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 551 \\ \times 62 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 603 \\ \times 14 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 428 \\ \times 33 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 333 \\ \times 66 \\ \hline \end{array}$$

$$\star 15. \quad 101 \\ \times 55 \\ \hline$$

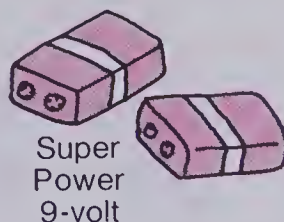
$$\star 16. \quad 101 \\ \times 39 \\ \hline$$

$$\star 17. \quad 1001 \\ \times 62 \\ \hline$$

$$\star 18. \quad 10101 \\ \times 34 \\ \hline$$

Estimation

21 cartons of transistor batteries.
68 batteries in each carton.
How many batteries altogether?



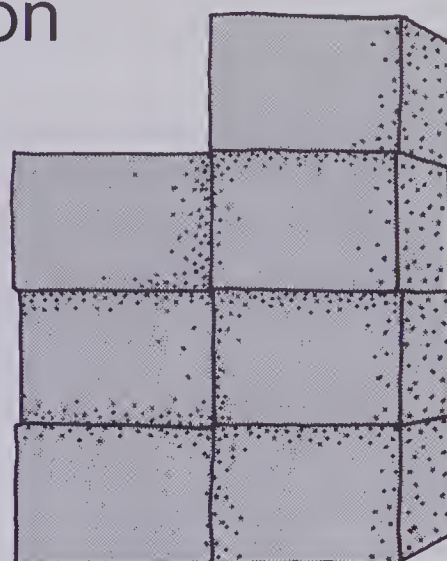
Estimate:
 21×68

then

Round both factors: 20×70

Think: $20 \times 70 = 1400$

About 1400 batteries.



Calculate:

Write:
$$\begin{array}{r} 68 \\ \times 21 \\ \hline 68 \\ 1360 \\ \hline 1428 \end{array}$$

There are 1428 batteries.

Is the written answer reasonable?

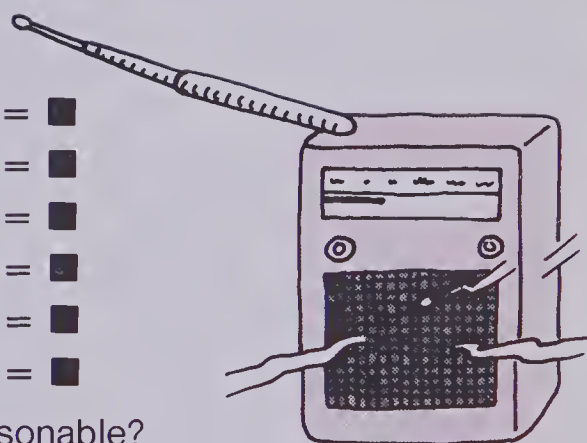
Exercises

Copy and complete these estimates.

To estimate:

1. $63 \times 77 \rightarrow 60 \times 80 = \blacksquare$
2. $78 \times 42 \rightarrow \blacksquare \times 40 = \blacksquare$
3. $32 \times 61 \rightarrow \blacksquare \times \blacksquare = \blacksquare$
4. $31 \times 488 \rightarrow 30 \times 500 = \blacksquare$
5. $25 \times 703 \rightarrow 30 \times \blacksquare = \blacksquare$
6. $48 \times 675 \rightarrow \blacksquare \times \blacksquare = \blacksquare$

Think:



Estimate first, then multiply. Are your calculated answers reasonable?

- | | | | | |
|---------------------|--------------------|---------------------|----------------------|-----------------------|
| 7. 56×21 | 8. 28×17 | 9. 462×26 | 10. 608×37 | 11. 85×43 |
| 12. 265×71 | 13. 55×13 | 14. 72×43 | 15. 666×12 | 16. 409×25 |
| 17. 815×62 | 18. 77×56 | 19. 320×81 | ★ 20. 99×47 | ★ 21. 999×99 |

The Gallery

The Gallery displays work by different artists.
The gallery is open 256 d (days) a year.
About 431 people attend every day.
About how many people attend altogether?



Multiply by ones.

$$\begin{array}{r} 431 \\ \times 256 \\ \hline 2\ 586 \end{array}$$

Multiply by tens.

$$\begin{array}{r} 431 \\ \times 256 \\ \hline 2\ 586 \\ 21\ 550 \end{array}$$

Multiply by hundreds.

$$\begin{array}{r} 431 \\ \times 256 \\ \hline 2\ 586 \\ 21\ 550 \\ 86\ 200 \end{array}$$

Add.

$$\begin{array}{r} 431 \\ \times 256 \\ \hline 2\ 586 \\ 21\ 550 \\ 86\ 200 \\ \hline 110\ 336 \end{array}$$

About 110 336 people attended.

Exercises

Multiply.

1.
$$\begin{array}{r} 232 \\ \times 145 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 116 \\ \times 231 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 307 \\ \times 245 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 290 \\ \times 118 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 319 \\ \times 156 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 406 \\ \times 8 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 517 \\ \times 6 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 2038 \\ \times 5 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 3172 \\ \times 4 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 28\ 160 \\ \times 7 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 521 \\ \times 24 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 409 \\ \times 35 \\ \hline \end{array}$$

13.
$$\begin{array}{r} 3712 \\ \times 14 \\ \hline \end{array}$$

14.
$$\begin{array}{r} 6291 \\ \times 25 \\ \hline \end{array}$$

15.
$$\begin{array}{r} 20\ 735 \\ \times 31 \\ \hline \end{array}$$

16.
$$\begin{array}{r} 418 \\ \times 125 \\ \hline \end{array}$$

17.
$$\begin{array}{r} 170 \\ \times 219 \\ \hline \end{array}$$

18.
$$\begin{array}{r} 509 \\ \times 362 \\ \hline \end{array}$$

19.
$$\begin{array}{r} 611 \\ \times 245 \\ \hline \end{array}$$

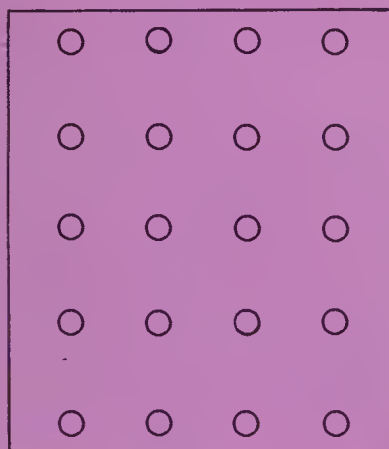
20.
$$\begin{array}{r} 760 \\ \times 461 \\ \hline \end{array}$$

Tune Up

Multiply.

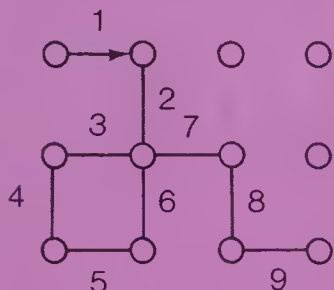
- | | | | | |
|--|--|---|--|---|
| 1. $\begin{array}{r} 68 \\ \times 23 \\ \hline \end{array}$ | 2. $\begin{array}{r} 503 \\ \times 6 \\ \hline \end{array}$ | 3. $\begin{array}{r} 2674 \\ \times 8 \\ \hline \end{array}$ | 4. $\begin{array}{r} 56 \\ \times 48 \\ \hline \end{array}$ | 5. $\begin{array}{r} 671 \\ \times 38 \\ \hline \end{array}$ |
| 6. $\begin{array}{r} 0.7 \\ \times 8 \\ \hline \end{array}$ | 7. $\begin{array}{r} 76.5 \\ \times 9 \\ \hline \end{array}$ | 8. $\begin{array}{r} 84.56 \\ \times 6 \\ \hline \end{array}$ | 9. $\begin{array}{r} 7.532 \\ \times 8 \\ \hline \end{array}$ | 10. $\begin{array}{r} 6.011 \\ \times 6 \\ \hline \end{array}$ |
| 11. $\begin{array}{r} 1415 \\ \times 68 \\ \hline \end{array}$ | 12. $\begin{array}{r} 611 \\ \times 245 \\ \hline \end{array}$ | 13. $\begin{array}{r} 777 \\ \times 54 \\ \hline \end{array}$ | 14. $\begin{array}{r} 999 \\ \times 501 \\ \hline \end{array}$ | 15. $\begin{array}{r} 7413 \\ \times 645 \\ \hline \end{array}$ |

BRAINTICKLER



Copy this grid into your notebook.

- Start at any circle. Connect with other circles.
Complete as many *squares* as possible.
- BE CAREFUL!
You may not lift your pencil from the paper.
You may not retrace or cross any lines.
- When no further moves can be made, the game is ended.
- Score:
4 points for each completed square.
3 points for each 3-sided connection.
2 points for each 2-sided connection.



The player in the example has made 14 points so *far*.

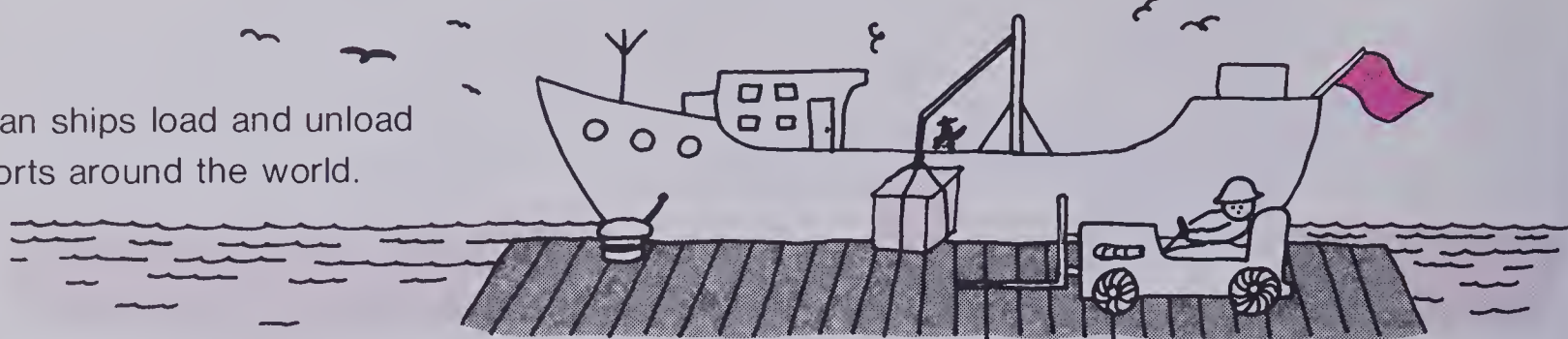
- | | |
|-----------------------|------------|
| 1 square | — 4 points |
| 2 3-sided connections | — 6 points |
| 2 2-sided connections | — 4 points |

14 points

What's your
highest score?

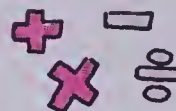
Dockyard Workers

Ocean ships load and unload at ports around the world.

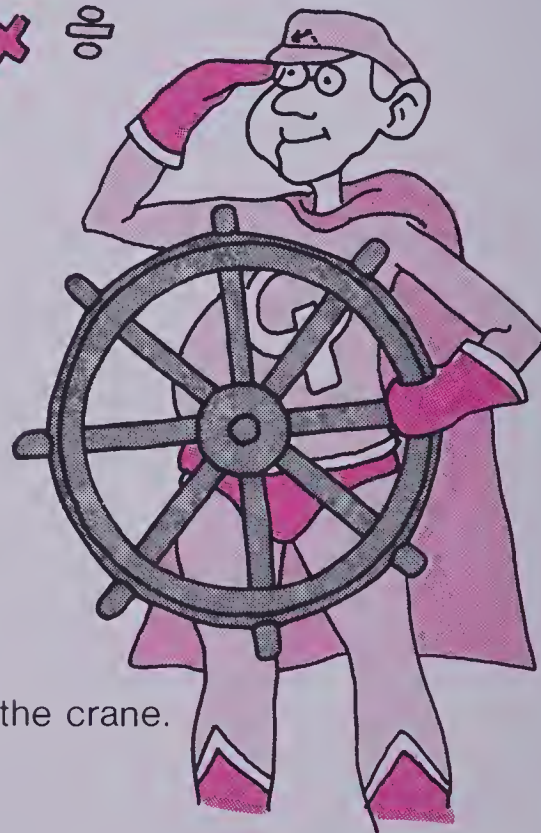


Exercises

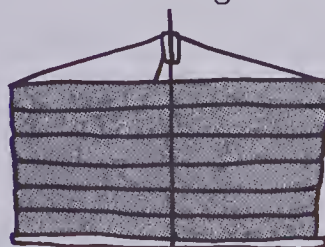
Solve these problems. Remember to answer Professor Q's four questions *mentally*.



1. The ship Tarfala unloaded 64 tractor wheels.
Each wheel had a mass of 92 kg.
What was the total mass of all the wheels?
2. Dockyard workers loaded 35 cases of cheese.
Each case contained 256 blocks.
How many blocks of cheese were loaded altogether?
3. The Kimi Maru has just unloaded 560 bags of rice.
Each bag has a mass of 47 kg.
Find the total mass of the rice.
4. A worker unhooked 9 bundles of untreated leather from the crane.
Each bundle was worth \$82.79.
What was the total value of the leather?
5. The Benalder is carrying 26 cases of aircraft propellers for a Halifax company.
Each case holds 14 propellers.
How many propellers is the Benalder carrying altogether?



6. Captain Benson has 8 packages of industrial diamonds in the ship's safe.
Each package is worth \$975.80.
What is the total value of the diamonds?
7. The crane operator of the Cardigan Bay loaded 47 carloads of iron ore.
The ore from each car had a mass of 22 t.
How many tonnes were loaded altogether on the ship?
8. The ship Aquarius delivered 176 rolls of newsprint to Tacoma Harbour and 195 rolls to Frederick Bay.
Each roll has a mass of 2 t.
How many rolls of newsprint were delivered altogether?
9. Shipworkers built 18 special sections on the ship Gastrana.
Each section holds 25 subcompact cars.
How many cars will the Gastrana carry?
10. Workers stored 16 206 bags of coffee beans in the warehouse.
12 948 bags were loaded onto the freighter North Star.
Each bag has a mass of 45 kg.
How many bags of coffee beans were left in the warehouse?
11. The delivery manager is putting together an order for electronic parts.
35 cartons were loaded onto a truck, 47 cartons were sitting on the dock,
and 54 cartons were sitting on the freighter Kamakura.
How many cartons of electronic parts were there altogether?
12. A company paid \$6759.00 for a shipment of transistor radios and \$9200.00 for a shipment of electric typewriters.
How much more did the company pay for the electric typewriters?
13. The crane operator carefully loaded 6 racks of steel ingots on the deck of the Selandia.
Each rack had a mass of 983 kg.
What was the total mass of the racks?



Go-Karts

The go-kart track at Milton Beach is 0.5 km long.

How far would Patrick travel in 13 laps?

Multiply.

$$\begin{array}{r}
 0.5 \\
 \times 13 \\
 \hline
 15 \\
 50 \\
 \hline
 6.5
 \end{array}$$

How many decimal places?

$$\begin{array}{r}
 13 \\
 \times 0.5 \\
 \hline
 6.5
 \end{array}$$

How many decimal places?

Patrick uses this simpler form!



Patrick would travel 6.5 km.

Exercises

Find the distances travelled by:

Kathleen

$$\begin{array}{r}
 1. \quad 17 \\
 \times 0.5 \\
 \hline
 \end{array}$$

John

$$\begin{array}{r}
 2. \quad 35 \\
 \times 0.5 \\
 \hline
 \end{array}$$

Sandy

$$\begin{array}{r}
 3. \quad 41 \\
 \times 0.5 \\
 \hline
 \end{array}$$

Michael

$$\begin{array}{r}
 4. \quad 23 \\
 \times 0.5 \\
 \hline
 \end{array}$$

Kim

$$\begin{array}{r}
 5. \quad 29 \\
 \times 0.5 \\
 \hline
 \end{array}$$

Multiply.

$$\begin{array}{r}
 6. \quad 32 \\
 \times 0.6 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 7. \quad 56 \\
 \times 0.2 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 8. \quad 40 \\
 \times 0.3 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 9. \quad 64 \\
 \times 0.8 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 10. \quad 21 \\
 \times 0.5 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 11. \quad 73 \\
 \times 0.2 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 12. \quad 85 \\
 \times 0.1 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 13. \quad 19 \\
 \times 0.9 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 14. \quad 36 \\
 \times 0.7 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 15. \quad 68 \\
 \times 0.6 \\
 \hline
 \end{array}$$

Solve.

16. Track — 0.4 km long
Laps — 35
Total distance?

17. Track — 0.6 km long
Laps — 42
Total distance?

Chair Lift

The chair lift carries skiers to the top of the ski slope.

Each trip is 0.9 km one way.

How many kilometres would a chair have travelled after 145 trips?

Multiply.

$$\begin{array}{r} 145 \\ \times 0.9 \\ \hline 130.5 \end{array}$$



A chair would have travelled 130.5 km.

Exercises

Multiply.

1. $\begin{array}{r} 371 \\ \times 0.6 \\ \hline \end{array}$

2. $\begin{array}{r} 2162 \\ \times 0.7 \\ \hline \end{array}$

3. $\begin{array}{r} 508 \\ \times 0.3 \\ \hline \end{array}$

4. $\begin{array}{r} 4928 \\ \times 0.5 \\ \hline \end{array}$

5. $\begin{array}{r} 1471 \\ \times 0.2 \\ \hline \end{array}$

6. $\begin{array}{r} 713 \\ \times 0.4 \\ \hline \end{array}$

7. $\begin{array}{r} 2051 \\ \times 0.8 \\ \hline \end{array}$

8. $\begin{array}{r} 7406 \\ \times 0.3 \\ \hline \end{array}$

9. $\begin{array}{r} 910 \\ \times 0.7 \\ \hline \end{array}$

10. $\begin{array}{r} 4682 \\ \times 0.9 \\ \hline \end{array}$

11. $\begin{array}{r} 801 \\ \times 0.8 \\ \hline \end{array}$

12. $\begin{array}{r} 333 \\ \times 0.6 \\ \hline \end{array}$

13. $\begin{array}{r} 5026 \\ \times 0.4 \\ \hline \end{array}$

14. $\begin{array}{r} 1978 \\ \times 0.2 \\ \hline \end{array}$

15. $\begin{array}{r} 6244 \\ \times 0.7 \\ \hline \end{array}$

16. Complete this maintenance sheet for the chair lift.

	Maintenance	Number of Trips	Distance in Kilometres
(a)	Grease gears at	120	$0.9 \times 120 = 108 \text{ km}$
(b)	Check safety brakes at	580	$0.9 \times \blacksquare = \blacksquare$
(c)	Inspect cable at	860	$0.9 \times \blacksquare = \blacksquare$
(d)	Test controls at	2570	$0.9 \times \blacksquare = \blacksquare$
(e)	Tune engine at	4750	$0.9 \times \blacksquare = \blacksquare$
(f)	Adjust wheels at	8640	$0.9 \times \blacksquare = \blacksquare$

Patterns With Decimal Factors

Investigate these patterns.

$\begin{array}{r} 125 \\ \times 0.3 \\ \hline 37.5 \end{array}$	\rightarrow	$\begin{array}{r} 12.5 \\ \times 0.3 \\ \hline 3.75 \end{array}$	\rightarrow	$\begin{array}{r} 1.25 \\ \times 0.3 \\ \hline 0.375 \end{array}$
---	---------------	--	---------------	---

$\begin{array}{r} 198 \\ \times 0.7 \\ \hline 138.6 \end{array}$	\rightarrow	$\begin{array}{r} 19.8 \\ \times 0.7 \\ \hline 13.86 \end{array}$	\rightarrow	$\begin{array}{r} 1.98 \\ \times 0.7 \\ \hline 1.386 \end{array}$
--	---------------	---	---------------	---

Find: The number of decimal places for each set of factors;
the number of decimal places in each product.

What rule helps you to find the number of decimal places in the product?

Exercises

Complete these patterns.

1.

$\begin{array}{r} 237 \\ \times 0.4 \\ \hline 94.8 \end{array}$	\rightarrow	$\begin{array}{r} 23.7 \\ \times 0.4 \\ \hline \square.\square\square \end{array}$	\rightarrow	$\begin{array}{r} 2.37 \\ \times 0.4 \\ \hline \square.\square\square\square \end{array}$
---	---------------	--	---------------	---

2.

$\begin{array}{r} 293 \\ \times 0.5 \\ \hline 146.5 \end{array}$	\rightarrow	$\begin{array}{r} 29.3 \\ \times 0.5 \\ \hline \square\square.\square\square \end{array}$	\rightarrow	$\begin{array}{r} 2.93 \\ \times 0.5 \\ \hline \square.\square\square\square \end{array}$
--	---------------	---	---------------	---

Multiply. Use the rule.

3.
$$\begin{array}{r} 43.7 \\ \times 0.5 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 1.36 \\ \times 0.2 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 2.41 \\ \times 0.4 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 2.39 \\ \times 0.9 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 68.2 \\ \times 0.3 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 1.49 \\ \times 0.3 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 2.87 \\ \times 0.7 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 3.51 \\ \times 0.6 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 56.9 \\ \times 0.5 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 1.99 \\ \times 0.2 \\ \hline \end{array}$$

Multiply.

13.
$$\begin{array}{r} 24.17 \\ \times 0.2 \\ \hline \end{array}$$

14.
$$\begin{array}{r} 3.642 \\ \times 0.4 \\ \hline \end{array}$$

15.
$$\begin{array}{r} 2.526 \\ \times 0.3 \\ \hline \end{array}$$

16.
$$\begin{array}{r} 418.3 \\ \times 0.4 \\ \hline \end{array}$$

17.
$$\begin{array}{r} 47.15 \\ \times 0.5 \\ \hline \end{array}$$

★ 18.
$$\begin{array}{r} 7.00 \\ \times 0.3 \\ \hline \end{array}$$

★ 19.
$$\begin{array}{r} 82.0 \\ \times 0.5 \\ \hline \end{array}$$

★ 20.
$$\begin{array}{r} 5.05 \\ \times 0.4 \\ \hline \end{array}$$

★ 21.
$$\begin{array}{r} 600 \\ \times 0.5 \\ \hline \end{array}$$

★ 22.
$$\begin{array}{r} 22.2 \\ \times 0.5 \\ \hline \end{array}$$

More Patterns

Investigate this pattern.

$\begin{array}{r} 256 \\ \times 0.31 \\ \hline 256 \\ 7680 \\ \hline 79.36 \end{array}$	\rightarrow	$\begin{array}{r} 25.6 \\ \times 0.31 \\ \hline 256 \\ 7680 \\ \hline 7.936 \end{array}$	\rightarrow	$\begin{array}{r} 2.56 \\ \times 0.31 \\ \hline 256 \\ 7680 \\ \hline 0.7936 \end{array}$
---	---------------	--	---------------	---

Hint:
Count the
number of
decimal places.

What rule helps you to find the number of decimal places in the product?

Exercises

Complete these patterns.

1.
$$\begin{array}{r} 146 \\ \times 0.21 \\ \hline 146 \\ 2920 \\ \hline 30.66 \end{array}$$
 \rightarrow
$$\begin{array}{r} 14.6 \\ \times 0.21 \\ \hline 146 \\ 2920 \\ \hline \square.\square\square\square \end{array}$$
 \rightarrow
$$\begin{array}{r} 1.46 \\ \times 0.21 \\ \hline 146 \\ 2920 \\ \hline \square.\square\square\square\square \end{array}$$

2.
$$\begin{array}{r} 526 \\ \times 0.43 \\ \hline 1\ 578 \\ 21\ 040 \\ \hline 226.18 \end{array}$$
 \rightarrow
$$\begin{array}{r} 52.6 \\ \times 0.43 \\ \hline 1\ 578 \\ 21\ 040 \\ \hline \square\square.\square\square\square \end{array}$$
 \rightarrow
$$\begin{array}{r} 5.26 \\ \times 0.43 \\ \hline 1\ 578 \\ 21\ 040 \\ \hline \square.\square\square\square\square \end{array}$$

Multiply. Use the rule.

3. $\begin{array}{r} 15.3 \\ \times 0.32 \\ \hline \end{array}$	4. $\begin{array}{r} 2.14 \\ \times 0.13 \\ \hline \end{array}$	5. $\begin{array}{r} 4.08 \\ \times 0.12 \\ \hline \end{array}$	6. $\begin{array}{r} 32.7 \\ \times 0.22 \\ \hline \end{array}$	7. $\begin{array}{r} 19.3 \\ \times 0.14 \\ \hline \end{array}$
8. $\begin{array}{r} 4.17 \\ \times 0.62 \\ \hline \end{array}$	9. $\begin{array}{r} 53.6 \\ \times 0.54 \\ \hline \end{array}$	10. $\begin{array}{r} 4.32 \\ \times 0.63 \\ \hline \end{array}$	11. $\begin{array}{r} 70.8 \\ \times 0.46 \\ \hline \end{array}$	12. $\begin{array}{r} 2.19 \\ \times 0.77 \\ \hline \end{array}$

Multiply.

13. $\begin{array}{r} 2.973 \\ \times 0.52 \\ \hline \end{array}$	14. $\begin{array}{r} 40.68 \\ \times 0.32 \\ \hline \end{array}$	15. $\begin{array}{r} 5124 \\ \times 0.23 \\ \hline \end{array}$	16. $\begin{array}{r} 3.705 \\ \times 0.46 \\ \hline \end{array}$
---	---	--	---

“Nothin’ But the Facts...”

Word stories can be restated in your own words!

Brendan is training for the gymnastic competition. His favourite movement is to do 4 backflips in a row. He practised this routine 9 times. How many backflips did he complete altogether?

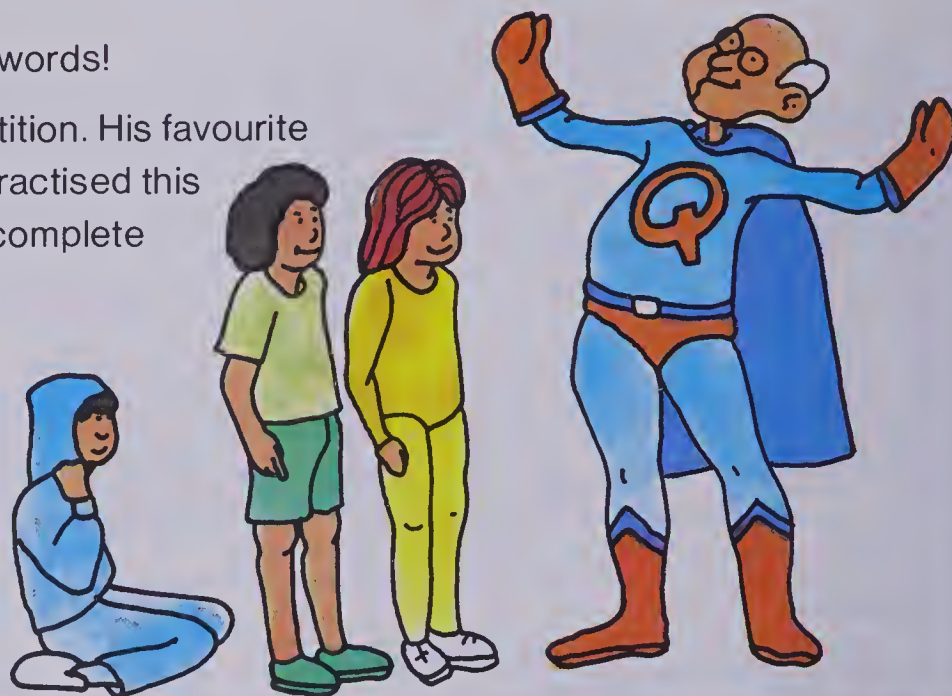
Professor Q restates the story.

4 backflips each time.

9 times.

How many backflips altogether?

$$(4 \times 9 = 36)$$



Exercises

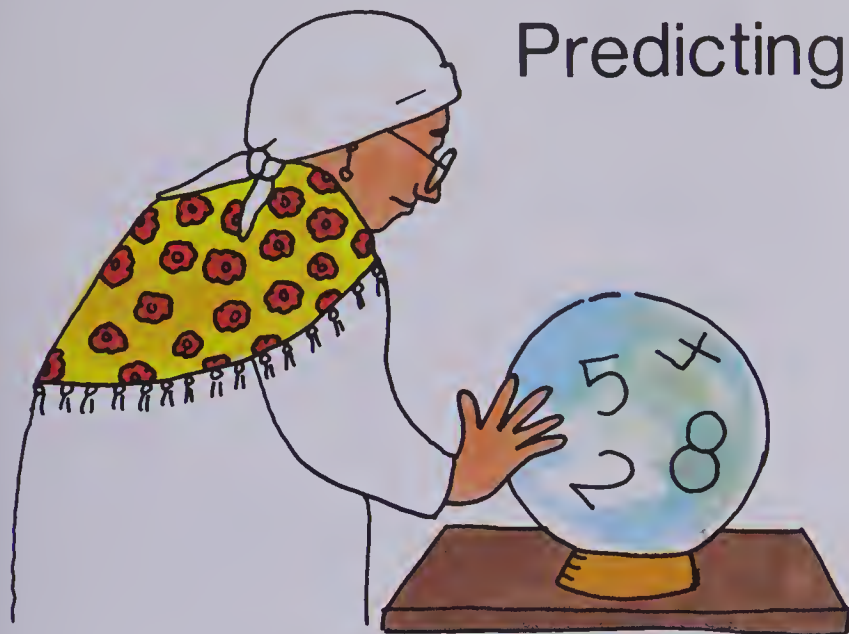
Restate each of these word stories in your own words, then solve.

1. Vicky is training for the city swimming meet. She swam 37 lengths of the pool in the morning and 58 lengths in the afternoon. How many lengths did Vicky complete altogether?
2. Rob and Nels play for the Cougar floor hockey team at Rockwood school. Over the season Rob has scored 19 goals and Nels has scored 31 goals. How many more goals has Nels scored than Rob?
3. Dianne is a member of the Northfield School volleyball team. She practises with her team 3 times every week. How many times would she practise in 14 weeks?
4. John's favourite game is golf. When he looked at his score cards from the summer, he discovered that his highest score was 102 and the lowest was 78. What is the difference between his highest and lowest score?

Predicting Answers

Often an answer can be predicted without calculating!

Try to predict the answers by using patterns.



Find the patterns, then predict the answers for each.
(How might you check your predictions?)

1. $1 \times 1 = 1$
 $11 \times 11 = 121$
 $111 \times 111 = 12321$
 $1111 \times 1111 = \underline{\hspace{2cm}}$
 $11111 \times 11111 = \underline{\hspace{2cm}}$

2. $37037 \times 3 = \underline{111111}$
 $37037 \times 6 = \underline{222222}$
 $37037 \times 9 = \underline{333333}$
 $37037 \times 12 = \underline{\hspace{2cm}}$
 $37037 \times 15 = \underline{\hspace{2cm}}$
 $37037 \times 18 = \underline{\hspace{2cm}}$
 $37037 \times 21 = \underline{\hspace{2cm}}$
 $37037 \times 24 = \underline{\hspace{2cm}}$
 $37037 \times 27 = \underline{\hspace{2cm}}$

3. $1 \times 9 + 2 = \underline{11}$
 $12 \times 9 + 3 = \underline{111}$
 $123 \times 9 + 4 = \underline{1111}$
 $1234 \times 9 + 5 = \underline{\hspace{2cm}}$
 $12345 \times 9 + 6 = \underline{\hspace{2cm}}$
 $123456 \times 9 + 7 = \underline{\hspace{2cm}}$
 $1234567 \times 9 + 8 = \underline{\hspace{2cm}}$
 $12345678 \times 9 + 9 = \underline{\hspace{2cm}}$

4. $1 \times 91 = \underline{91}$
 $2 \times 91 = \underline{182}$
 $3 \times 91 = \underline{273}$
 $4 \times 91 = \underline{364}$
 $5 \times 91 = \underline{\hspace{2cm}}$
 $6 \times 91 = \underline{\hspace{2cm}}$
 $7 \times 91 = \underline{\hspace{2cm}}$
 $8 \times 91 = \underline{\hspace{2cm}}$
 $9 \times 91 = \underline{\hspace{2cm}}$

5. $1 \times 8 + 1 = \underline{9}$
 $12 \times 8 + 2 = \underline{98}$
 $123 \times 8 + 3 = \underline{987}$
 $1234 \times 8 + 4 = \underline{9876}$
 $12345 \times 8 + 5 = \underline{\hspace{2cm}}$
 $123456 \times 8 + 6 = \underline{\hspace{2cm}}$
 $1234567 \times 8 + 7 = \underline{\hspace{2cm}}$
 $12345678 \times 8 + 8 = \underline{\hspace{2cm}}$



6. $222222 \times 9 = \underline{1999998}$
 $333333 \times 9 = \underline{2999997}$
 $444444 \times 9 = \underline{3999996}$
 $555555 \times 9 = \underline{\hspace{2cm}}$
 $666666 \times 9 = \underline{\hspace{2cm}}$
 $777777 \times 9 = \underline{\hspace{2cm}}$
 $888888 \times 9 = \underline{\hspace{2cm}}$
 $999999 \times 9 = \underline{\hspace{2cm}}$

Chapter Test

Write the products.

1. (a) 9×1

(b) 18×100

(c) 245×10

(d) 37×1000

2. (a) 8×30

(b) 4×900

(c) 5×7000

(d) 6×800

3. (a) 10×70

(b) 40×60

(c) 50×300

(d) 200×400

Multiply.

4. (a)
$$\begin{array}{r} 63 \\ \times 4 \\ \hline \end{array}$$

(b)
$$\begin{array}{r} 217 \\ \times 5 \\ \hline \end{array}$$

(c)
$$\begin{array}{r} 4208 \\ \times 3 \\ \hline \end{array}$$

(d)
$$\begin{array}{r} 30195 \\ \times 6 \\ \hline \end{array}$$

5. (a)
$$\begin{array}{r} 60 \\ \times 51 \\ \hline \end{array}$$

(b)
$$\begin{array}{r} 82 \\ \times 36 \\ \hline \end{array}$$

(c)
$$\begin{array}{r} 509 \\ \times 43 \\ \hline \end{array}$$

(d)
$$\begin{array}{r} 271 \\ \times 284 \\ \hline \end{array}$$

6. (a)
$$\begin{array}{r} 1.6 \\ \times 2 \\ \hline \end{array}$$

(b)
$$\begin{array}{r} 52.1 \\ \times 4 \\ \hline \end{array}$$

(c)
$$\begin{array}{r} 129.30 \\ \times 4 \\ \hline \end{array}$$

(d)
$$\begin{array}{r} 4.127 \\ \times 3 \\ \hline \end{array}$$

7. (a)
$$\begin{array}{r} 6 \\ \times 0.8 \\ \hline \end{array}$$

(b)
$$\begin{array}{r} 13 \\ \times 0.7 \\ \hline \end{array}$$

(c)
$$\begin{array}{r} 810 \\ \times 0.6 \\ \hline \end{array}$$

(d)
$$\begin{array}{r} 5244 \\ \times 0.3 \\ \hline \end{array}$$

8. (a)
$$\begin{array}{r} 28.1 \\ \times 0.7 \\ \hline \end{array}$$

(b)
$$\begin{array}{r} 1.729 \\ \times 0.2 \\ \hline \end{array}$$

(c)
$$\begin{array}{r} 16.2 \\ \times 0.13 \\ \hline \end{array}$$

(d)
$$\begin{array}{r} 47.01 \\ \times 0.26 \\ \hline \end{array}$$

Solve.

9. An electronics company in Vancouver received 8 cases from the freighter Orion. Each case contained 75 transistor radios. How many radios were received altogether?
10. A motorcycle racetrack is 2.7 km long. How far would a rider travel in 9 laps?

Cumulative Review

1. Write the meaning of each underlined digit.

(a) 129 075

(b) 38.416

(c) 712.49

2. Round each number to the nearest tenth.

(a) 453.26

(b) 12.151

(c) 8.05

(d) 62.418

3. Add.

$$\begin{array}{r} (a) \quad 18 \\ 29 \\ +55 \\ \hline \end{array}$$

$$\begin{array}{r} (b) \quad 3.26 \\ +2.95 \\ \hline \end{array}$$

$$\begin{array}{r} (c) \quad 71.09 \\ +25.68 \\ \hline \end{array}$$

$$\begin{array}{r} (d) \quad 217\,805 \\ +369\,529 \\ \hline \end{array}$$

4. Subtract.

$$\begin{array}{r} (a) \quad 8.02 \\ -4.63 \\ \hline \end{array}$$

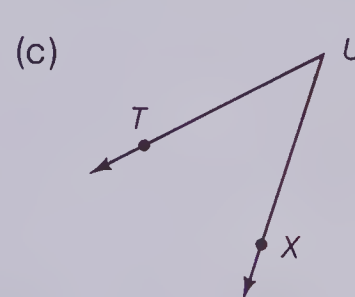
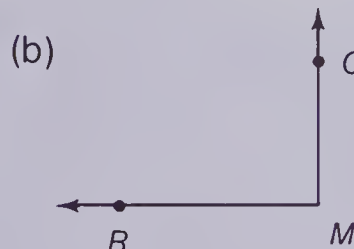
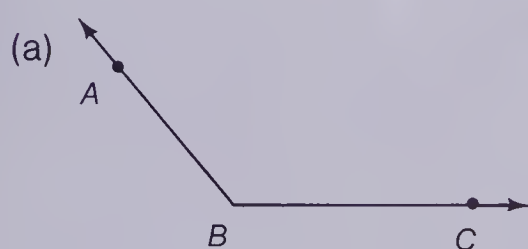
$$\begin{array}{r} (b) \quad 420.51 \\ -173.26 \\ \hline \end{array}$$

$$\begin{array}{r} (c) \quad 68\,285 \\ -45\,017 \\ \hline \end{array}$$

$$\begin{array}{r} (d) \quad 743\,809 \\ -216\,470 \\ \hline \end{array}$$

5. For each of the following:

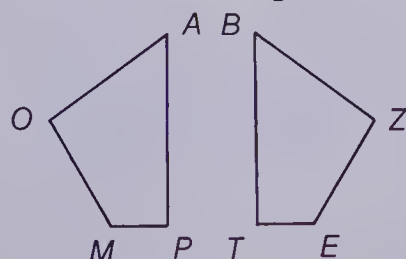
(i) name the vertex; (ii) name the angle; (iii) name type of angle represented.



6. Construct a circle with a radius of 3 cm. What is the length of the diameter?

7. This pair of shapes is congruent.

Name the matching vertices.



8. Multiply.

$$\begin{array}{r} (a) \quad 721 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} (b) \quad 803 \\ \times 47 \\ \hline \end{array}$$

$$\begin{array}{r} (c) \quad 270.6 \\ \times 0.4 \\ \hline \end{array}$$

$$\begin{array}{r} (d) \quad 3.419 \\ \times 0.25 \\ \hline \end{array}$$

Chapter 4

Division and Measurement

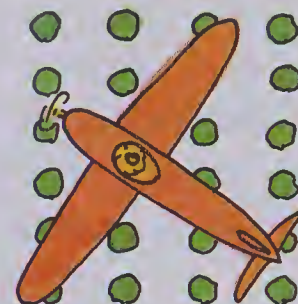
One-digit Divisors
Length and Capacity
Mass and Time



Aerial Photographs

Bob is taking aerial photographs of this orchard.

There are 24 trees with 6 rows and 4 columns.



$$24 \div 6$$

This asks, "How many groups of 6 in 24?"

dividend		divisor		quotient
↓		↓		↓
24	÷	6	=	4
				4
				6) 24



$$6 \times 4 = 24$$

Related multiplication fact

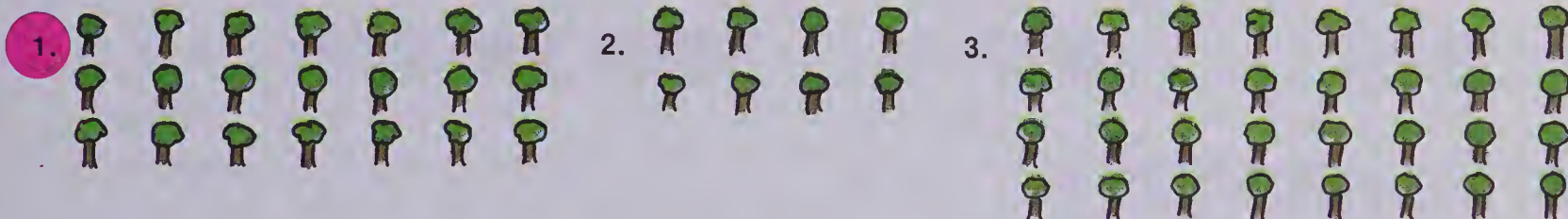
$$24 \div 4$$

This asks, "How many groups of 4 in 24?"

dividend		divisor		quotient
↓		↓		↓
24	÷	4	=	6
				6
				4) 24

Exercises

Write 2 division sentences for each pattern.



Draw patterns to show each division. Write a second division to match.

4. $18 \div 3$

5. $2 \overline{)12}$

6. $25 \div 5$

7. $4 \overline{)16}$

Write in words what is being asked, then find the quotient.

8. $30 \div 6$

9. $9 \overline{)63}$

10. $21 \div 7$

11. $40 \div 8$

12. $2 \overline{)14}$

13. $7 \overline{)49}$

14. $72 \div 8$

15. $5 \overline{)15}$

Write a division sentence that expresses how many groups of:

16. 7 in 56

17. 5 in 45

18. 3 in 30

19. 4 in 36

20. 2 in 18

21. 8 in 24

22. 7 in 28

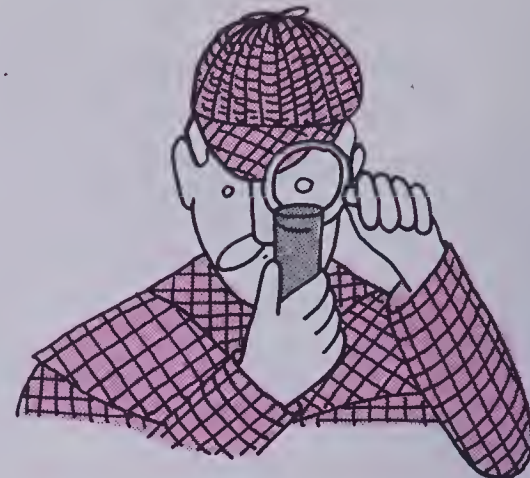
23. 6 in 48.

Division Riddles

Copy and complete each division exercise.

In your workbook, match the letters with each answer.

The first one is done for you.



A. What inventions have helped people up in the world?

- | | | | | |
|---------------------------|------------------------|------------------------|-----------------------|------------------------|
| D | N | E | L | A |
| 1. $2 \overline{)8}$
4 | 2. $9 \overline{)27}$ | 3. $4 \overline{)32}$ | 4. $7 \overline{)35}$ | 5. $9 \overline{)9}$ |
| O | T | C | R | H |
| 6. $5 \overline{)10}$ | 7. $3 \overline{)18}$ | 8. $7 \overline{)0}$ | 9. $5 \overline{)55}$ | 10. $8 \overline{)72}$ |
| K | V | M | | |
| 11. $6 \overline{)42}$ | 12. $3 \overline{)36}$ | 13. $8 \overline{)80}$ | | |

$\overline{6} \quad \overline{9} \quad \overline{8}$

$\overline{8} \quad \overline{5} \quad \overline{8} \quad \overline{12} \quad \overline{1} \quad \overline{6} \quad \overline{2} \quad \overline{11}$

$\overline{1} \quad \overline{3} \quad \overline{4}$

$\overline{6} \quad \overline{9} \quad \overline{8}$

$\overline{1} \quad \overline{5} \quad \overline{1} \quad \overline{11} \quad \overline{10}$

$\overline{0} \quad \overline{5} \quad \overline{2} \quad \overline{0} \quad \overline{7}$

B. What goes through a door, but never goes in or comes out?

- | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|
| L | A | E | H |
| 1. $9 \overline{)63}$ | 2. $5 \overline{)15}$ | 3. $7 \overline{)42}$ | 4. $8 \overline{)64}$ |
| Y | K | O | |
| 5. $7 \overline{)35}$ | 6. $9 \overline{)81}$ | 7. $6 \overline{)24}$ | |

$\overline{3}$

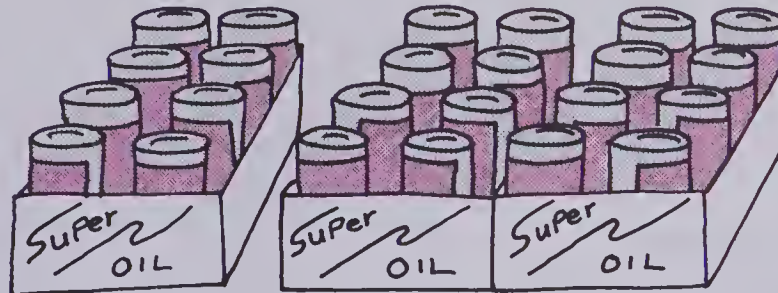
$\overline{9} \quad \overline{6} \quad \overline{5} \quad \overline{8} \quad \overline{4} \quad \overline{7} \quad \overline{6}$

Service Station Operator

24 cans of "Super Oil".
8 cans in each case.
How many cases?

$$24 \div 8 = N$$

This asks, "How many groups?"



24 cans of "Super Oil".
3 cases.
How many cans in each case?

$$24 \div 3 = N$$

This asks, "How many things in each group?"

Exercises

Tell what each problem asks, then solve.

1. 40 cans of wheel grease.
8 cans in each case.
How many cases?

3. 56 tubes of lock deicer.
8 cases.
How many tubes in each case?

5. 63 fan belts.
7 fan belts in each package.
How many packages?

- ★ 7. 116 cans of transmission fluid.
4 cases.
How many cans in each case?

2. 36 bottles of windshield wiper fluid.
9 cases.
How many bottles in each case?

4. 15 cans of radiator cleaner.
5 cases.
How many cans in each case?

6. 48 tins of gas saver.
6 tins in each case.
How many cases?

- ★ 8. 84 cans of "Sparkle" car wax.
6 cans in each case.
How many cases?



A Visit With Division Forms

Let's review the steps of the long and short forms.

Long Form

$$84 \div 3$$

Short Form

Multiples of 10

Step 1



$$\begin{array}{r} 20 \\ 3 \overline{)84} \\ \underline{60} \\ 24 \end{array}$$

Estimate 20.
Write 20.

Step 1



$$\begin{array}{r} 2 \\ 3 \overline{)84} \\ \underline{60} \\ 24 \end{array}$$

Estimate 20.
Write 2 in
the ten's place.

Multiples of 1

Step 2

$$\begin{array}{r} 28 \\ 8 \\ 20 \\ 3 \overline{)84} \\ \underline{60} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

Estimate 8.
Write 8.

Step 2

$$\begin{array}{r} 28 \\ 3 \overline{)84} \\ \underline{60} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

Estimate 8.
Write 8 in
the one's place.

Exercises

Divide.

1. $4 \overline{)92}$
6. $3 \overline{)96}$

2. $2 \overline{)72}$
7. $4 \overline{)76}$

3. $3 \overline{)75}$
8. $6 \overline{)84}$

4. $5 \overline{)65}$
9. $4 \overline{)60}$

5. $4 \overline{)68}$
10. $7 \overline{)91}$

Divide.

11. $\begin{array}{r} 4 \blacksquare \\ 3 \overline{)138} \\ \underline{120} \\ \blacksquare \blacksquare \\ \blacksquare \blacksquare \\ \blacksquare \end{array}$

12. $\begin{array}{r} \blacksquare \blacksquare \\ 7 \overline{)266} \\ \underline{\blacksquare \blacksquare \blacksquare} \\ \blacksquare \blacksquare \\ \blacksquare \blacksquare \\ \blacksquare \end{array}$

13. $6 \overline{)258}$
15. $4 \overline{)116}$
17. $9 \overline{)216}$
19. $7 \overline{)441}$


14. $5 \overline{)235}$
16. $8 \overline{)208}$
18. $3 \overline{)162}$
20. $6 \overline{)348}$

Introducing a New Division Form

Consider $84 \div 3$. Terry works with this form.

Write:

$$\begin{array}{r} 2 \\ 3 \overline{) 84} \\ \underline{6} \\ 24 \end{array}$$

Step 1  (Terry writes "4" here.)

$3 \overline{) 8}$?

Think: Terry estimates 2.
($3 \times 2 = 6$)

$$\begin{array}{r} 28 \\ 3 \overline{) 84} \\ \underline{6} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

Step 2

$84 \div 3 = 28$

$3 \overline{) 24}$?

Terry estimates 8.
($3 \times 8 = 24$)

Exercises

Help Terry work through these two examples.

1. $4 \overline{) 92}$

Estimate 2.
($4 \times 2 = 8$)

$$\begin{array}{r} 2 \\ 4 \overline{) 92} \\ \underline{8} \\ 12 \end{array}$$

2. $4 \overline{) 92}$

Estimate ■.
($4 \times \blacksquare = 12$)

$$\begin{array}{r} 2 \blacksquare \\ 4 \overline{) 92} \\ \underline{8} \\ 12 \\ \underline{\blacksquare \blacksquare} \\ \blacksquare \end{array}$$

2. $4 \overline{) 148}$

Estimate 3.
($4 \times 3 = 12$)

$$\begin{array}{r} 3 \\ 4 \overline{) 148} \\ \underline{12} \\ 28 \end{array}$$

3. $4 \overline{) 148}$

Estimate ■.
($4 \times \blacksquare = 28$)

$$\begin{array}{r} 3 \blacksquare \\ 4 \overline{) 148} \\ \underline{12} \\ 28 \\ \underline{\blacksquare \blacksquare} \\ \blacksquare \end{array}$$

Divide.

3. $4 \overline{) 64}$

4. $6 \overline{) 84}$

5. $3 \overline{) 72}$

6. $5 \overline{) 65}$

7. $6 \overline{) 78}$

8. $6 \overline{) 144}$

9. $5 \overline{) 115}$

10. $7 \overline{) 238}$

11. $4 \overline{) 140}$

12. $8 \overline{) 104}$

Extending the New Form

Consider $952 \div 4$. Irene works with this example.

Step 1

$$\begin{array}{r} 2 \\ 4 \overline{) 952} \\ \underline{8} \\ 15 \end{array}$$

Think:

?
 $4 \overline{) 9}$ She estimates 2.
 $4 \times 2 = 8$

Step 2

$$\begin{array}{r} 23 \\ 4 \overline{) 952} \\ \underline{8} \\ 15 \\ \underline{12} \\ 32 \end{array}$$

Think:

?
 $4 \overline{) 15}$ She estimates 3.
 $4 \times 3 = 12$

Step 3

$$\begin{array}{r} 238 \\ 4 \overline{) 952} \\ \underline{8} \\ 15 \\ \underline{12} \\ 32 \\ \underline{32} \\ 0 \end{array}$$

Think:

?
 $4 \overline{) 32}$ She estimates 8.
 $4 \times 8 = 32$

$$952 \div 4 = 238$$

Exercises

Complete.

1.
$$\begin{array}{r} 12 \square \\ 7 \overline{) 868} \\ \underline{7} \\ 16 \\ \underline{14} \\ \square 8 \\ \underline{\square \square} \\ \square \end{array}$$

2.
$$\begin{array}{r} 3 \square \square \\ 6 \overline{) 1962} \\ \underline{18} \\ 16 \\ \underline{\square \square} \\ \square \square \\ \underline{\square \square} \\ \square \end{array}$$

Divide.

3. $8 \overline{) 976}$

4. $7 \overline{) 861}$

5. $5 \overline{) 675}$

6. $4 \overline{) 936}$

7. $8 \overline{) 936}$

8. $2 \overline{) 722}$

9. $5 \overline{) 765}$

10. $4 \overline{) 948}$

11. $6 \overline{) 1944}$

12. $5 \overline{) 1205}$

13. $7 \overline{) 1659}$

14. $4 \overline{) 2052}$

15. $3 \overline{) 1248}$

16. $8 \overline{) 1872}$

17. $4 \overline{) 1448}$

18. $7 \overline{) 3661}$

Special Numbers in Division

Investigate the patterns made by:

a 5000 machine.

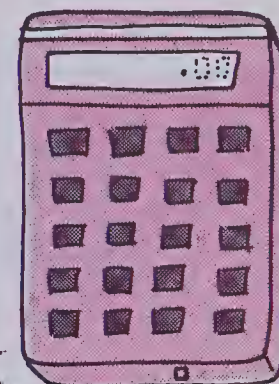
$$\begin{array}{l} 5000 \div 1 = 5000 \\ 5000 \div 10 = 500 \\ 5000 \div 100 = 50 \\ 5000 \div 1000 = 5 \end{array}$$

What rule helps you divide by 1, 10, 100, 1000?

a 256 machine.

$$\begin{array}{l} 256 \div 1 = 256 \\ 256 \div 10 = 25.6 \\ 256 \div 100 = 2.56 \\ 256 \div 1000 = 0.256 \end{array}$$

What rule helps you divide by 1, 10, 100, 1000?



Exercises

Copy and complete the patterns made by these machines.

1.
$$\begin{array}{l} 600 \div 1 = 600 \\ 600 \div 10 = \boxed{} \\ 600 \div 100 = \boxed{} \\ 600 \div 1000 = 0.6 \end{array}$$

2.
$$\begin{array}{l} 100 \div 1 = \boxed{} \\ 100 \div 10 = 10 \\ 100 \div 100 = \boxed{} \\ 100 \div 1000 = \boxed{} \end{array}$$

3.
$$\begin{array}{l} 4581 \div 1 = \boxed{} \\ 4581 \div 10 = \boxed{} \\ 4581 \div 100 = 45.81 \\ 4581 \div 1000 = \boxed{} \end{array}$$

4.
$$\begin{array}{l} 999 \div 1 = \boxed{} \\ 999 \div 10 = \boxed{} \\ 999 \div 100 = \boxed{} \\ 999 \div 1000 = \boxed{} \end{array}$$

Divide. Use your rule to help you find each quotient *mentally*.

5. $500 \div 10$

6. $45 \div 100$

7. $200 \div 1$

8. $6000 \div 100$

9. $8000 \div 1000$

10. $40 \div 1000$

11. $1000 \div 10$

12. $387 \div 100$

13. $2365 \div 10$

14. $1000 \div 100$

15. $700 \div 1000$

16. $10 \div 1$

17. $9000 \div 10$

18. $555 \div 1000$

19. $100 \div 100$

20. $400 \div 10$

Exploring the World of 10

Kathleen has discovered an interesting fact!
She drew this diagram.



What has Kathleen discovered?

Exercises

Using Kathleen's discovery, complete the chart.
Use a rule to help you work *mentally*.

1.

Numbers	\div 10	Equals
5000	\div 10	500
250	\div 10	
48	\div 10	4.8
9999	\div 10	
100	\div 10	
273	\div 10	
5	\div 10	

Numbers	\times 0.1	Equals
5000	\times 0.1	
250	\times 0.1	25
48	\times 0.1	
9999	\times 0.1	
100	\times 0.1	
273	\times 0.1	27.3
5	\times 0.1	

Divide.

2. $500 \div 10$

3. $614 \div 10$

4. $1000 \div 10$

5. $32 \div 10$

Multiply.

6. 500×0.1

7. 614×0.1

8. 1000×0.1

9. 32×0.1

Solve.

10. $241 \div 10$

11. 16×0.1

12. 200×0.1

13. 6×0.1

14. 7000×0.1

15. $41 \div 10$

16. 10×0.1

17. $527 \div 10$

18. $3 \div 10$

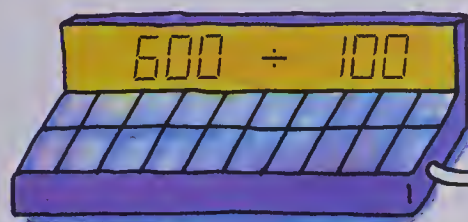
19. 888×0.1

20. $620 \div 10$

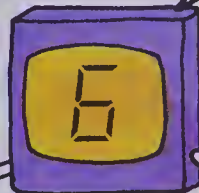
21. 9406×0.1

Exploring the World of 100

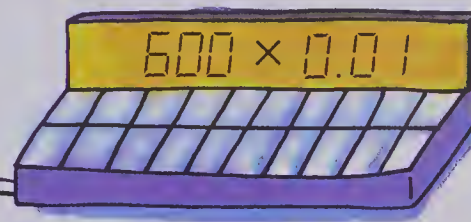
Can you explain what Dr. Morrow's machine shows?



Dividing by 100



Can you make a rule?



Multiplying by 0.01

Exercises

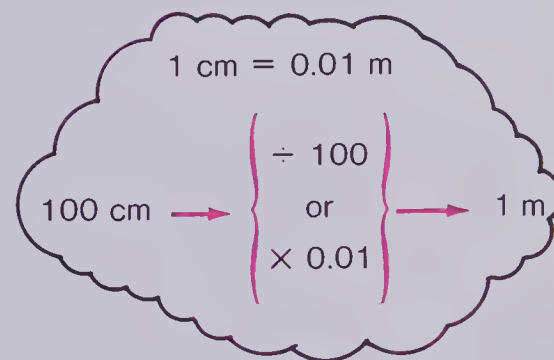
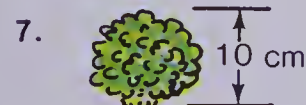
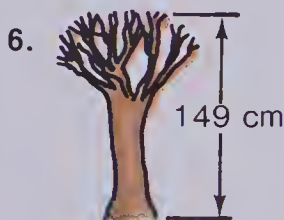
Complete.

1. $4000 \div 100 = ?$
 $400 \div 100 = ?$
 $40 \div 100 = ?$
 $4 \div 100 = ?$

2. $5000 \times 0.01 = ?$
 $500 \times 0.01 = ?$
 $50 \times 0.01 = ?$
 $5 \times 0.01 = ?$

3. $6735 \div 100 = ?$
 $14 \times 0.01 = ?$
 $8 \times 0.01 = ?$
 $250 \div 100 = ?$

The following shrubs and trees are measured in centimetres.
 Change each to metres.

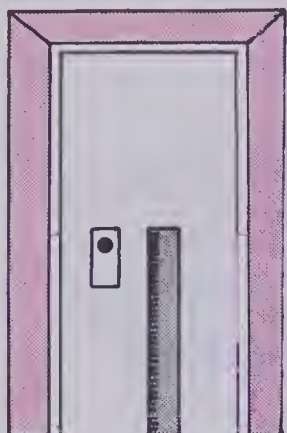


Change the following centimetre measurements to metres.

Use your rule to help you work *mentally*.

9. 268 cm = ■ m 10. 580 cm = ■ m 11. 1256 cm = ■ m 12. 450 cm = ■ m

13. 1 cm = ■ m 14. 101 cm = ■ m 15. 2000 cm = ■ m 16. 11 cm = ■ m



Centimetres and Metres

$$\begin{aligned} 1 \text{ m} &= 100 \text{ cm} \\ 2 \text{ m} &= 200 \text{ cm} \\ 3.5 \text{ m} &= 350 \text{ cm} \end{aligned}$$

$$\begin{aligned} 100 \text{ cm} &= 1 \text{ m} \\ 200 \text{ cm} &= 2 \text{ m} \\ 450 \text{ cm} &= 4.5 \text{ m} \end{aligned}$$

To change

metres to centimetres
multiply by 100.

To change

centimetres to metres
divide by 100.

A doorknob is about 1 m
or 100 cm from the floor.

Activity (Work in groups.)

1. Draw segments which are 1 m, 2 m, 3 m, and 4 m long.
Use your centimetre tape to measure each segment in centimetres.
Copy and complete.

$$1 \text{ m} = \blacksquare \text{ cm}$$

$$2 \text{ m} = \blacksquare \text{ cm}$$

$$3 \text{ m} = \blacksquare \text{ cm}$$

$$4 \text{ m} = \blacksquare \text{ cm}$$

$$400 \text{ cm} = \blacksquare \text{ m}$$

$$300 \text{ cm} = \blacksquare \text{ m}$$

$$200 \text{ cm} = \blacksquare \text{ m}$$

$$100 \text{ cm} = \blacksquare \text{ m}$$

2. Draw a segment 50 cm long. How many metres long is it?

$$50 \div 100 = 0.5$$

3. Draw a segment 0.7 m long. How many centimetres long is it?

$$0.7 \times 100 = 70$$

Exercises

Change each to centimetres.

1. 3 m

2. 6 m

3. 1.6 m

4. 3.4 m

5. 5.6 m

Change each to metres.

6. 200 cm

7. 800 cm

8. 150 cm

9. 640 cm

10. 765 cm

Frog-Jumping Contest

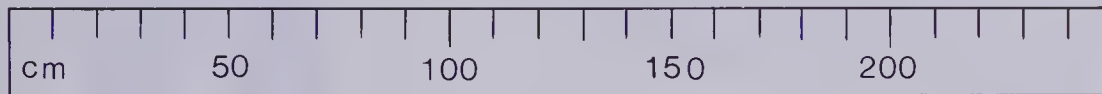
Mark, Sue, and Lee measured the distance Mark's pet frog, Greenback, jumped.



Mark measured in *metres*.



Sue measured in *decimetres*.



Lee measured in *centimetres*.

To change

metres to decimetres
multiply by 10.

$$2 \text{ m} = 20 \text{ dm}$$

metres to centimetres
multiply by 100.

$$2 \text{ m} = 200 \text{ cm}$$

To change

decimetres to metres
divide by 10.

$$20 \text{ dm} = 2 \text{ m}$$

centimetres to metres
divide by 100.

$$200 \text{ cm} = 2 \text{ m}$$

Exercises

Change to decimetres.

1. $6 \text{ m} = \blacksquare \text{ dm}$

2. $35 \text{ m} = \blacksquare \text{ dm}$

3. 26 m

4. 149 m

Change to centimetres.

5. $4 \text{ m} = \blacksquare \text{ cm}$

6. $67 \text{ m} = \blacksquare \text{ cm}$

7. 45 m

8. 24 m

Change to metres.

9. $130 \text{ dm} = \blacksquare \text{ m}$

10. $230 \text{ dm} = \blacksquare \text{ m}$

11. 5700 dm

12. 6800 dm

13. $500 \text{ cm} = \blacksquare \text{ m}$

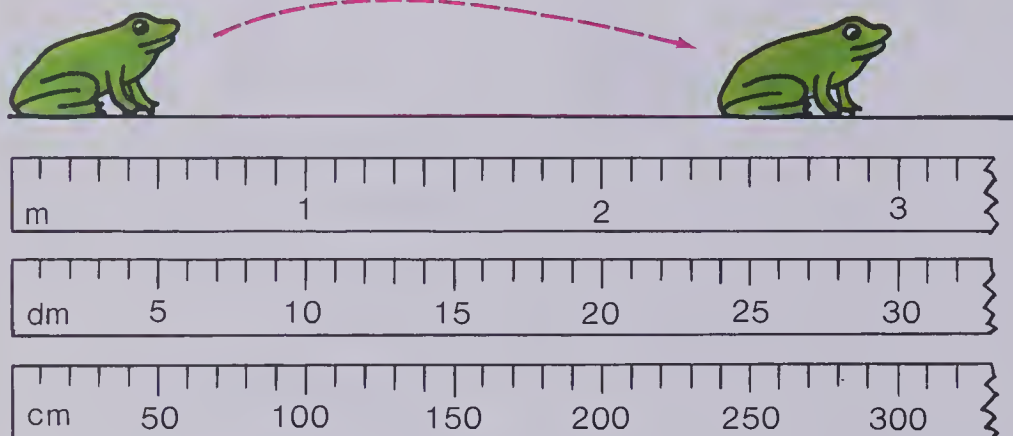
14. $800 \text{ cm} = \blacksquare \text{ m}$

15. 700 cm

16. 2300 cm

The Championship

Mark measured his frog's jump to the nearest tenth of a metre.



$$2.4 \text{ m} = 24 \text{ dm}$$

$$24 \text{ dm} = 2.4 \text{ m}$$

$$2.4 \text{ m} = 240 \text{ cm}$$

$$240 \text{ cm} = 2.4 \text{ m}$$

Exercises

Change to decimetres.

1. $4.3 \text{ m} = \blacksquare \text{ dm}$

2. $2.7 \text{ m} = \blacksquare \text{ dm}$

3. 5.2 m

4. 0.9 m

Change to centimetres.

5. $2.7 \text{ m} = \blacksquare \text{ cm}$

6. $3.1 \text{ m} = \blacksquare \text{ cm}$

7. 5.6 m

8. 0.8 m

Change to metres.

9. $45 \text{ dm} = \blacksquare \text{ m}$

10. $39 \text{ dm} = \blacksquare \text{ m}$

11. 88 dm

12. 7 dm

13. $260 \text{ cm} = \blacksquare \text{ m}$

14. $780 \text{ dm} = \blacksquare \text{ m}$

15. 1180 cm

16. 30 cm

17. Mark's frog jumped 3.6 m.
Sue's frog jumped 27 dm.
How many metres further
did Mark's frog jump?

18. Lee's frog jumped 210 cm.
Mark's frog jumped 0.3 m further.
How many centimetres did Mark's
frog jump?

Kilometres and Hectometres

While at camp Lee and René entered a race.
The track was 100 m long. The race was 1 km long.
They ran the track 10 times.

$$1000 \text{ m} = 1 \text{ km}$$

To change

kilometres to metres
multiply by 1000.

$$1.5 \text{ km} = 1500 \text{ m}$$



$$1 \text{ lap} = 100 \text{ m}$$

$$2 \text{ laps} = 200 \text{ m}$$

...

$$9 \text{ laps} = 900 \text{ m}$$

$$10 \text{ laps} = 1000 \text{ m}$$

To change

metres to kilometres
divide by 1000.

$$2200 \text{ m} = 2.2 \text{ km}$$

$$1 \text{ hm} = 100 \text{ m}$$

(hm means hectometres)

$$1 \text{ km} = 10 \text{ hm}$$

Exercises

- How many metres in a kilometre?
- How many hectometres in a kilometre?
- The length of a race was 2.5 km.
How many metres is this?
- Gary runs 3 km every morning.
How many hectometres is this?

Change to metres.

$$5. \quad 2 \text{ km} = \blacksquare \text{ m}$$

$$8. \quad 0.75 \text{ km} = \blacksquare \text{ m}$$

$$6. \quad 32 \text{ km} = \blacksquare \text{ m}$$

$$9. \quad 0.8 \text{ km} = \blacksquare \text{ m}$$

$$7. \quad 6.5 \text{ km} = \blacksquare \text{ m}$$

$$10. \quad 2.8 \text{ km} = \blacksquare \text{ m}$$

Change to kilometres.

$$11. \quad 7000 \text{ m} = \blacksquare \text{ km}$$

$$13. \quad 250 \text{ m} = \blacksquare \text{ km}$$

$$12. \quad 3750 \text{ m} = \blacksquare \text{ km}$$

$$14. \quad 500 \text{ m} = \blacksquare \text{ km}$$

- How many laps of a 500 m track are necessary to make 2.5 km?
- Which is larger: kilometre or hectometre?
kilometre or metre?
hectometre or metre?



Tune Up

Multiply.

$$\begin{array}{r} 1. \quad 32 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 355 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 410 \\ \times 100 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 375 \\ \times 100 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 8456 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 2.2 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 35.2 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 4.65 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 7.31 \\ \times 100 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 23.41 \\ \times 100 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 329 \\ \times 38 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 276 \\ \times 43 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 117 \\ \times 0.3 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 113 \\ \times 0.8 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 228 \\ \times 0.7 \\ \hline \end{array}$$

$$16. \quad 7 \overline{)175}$$

$$17. \quad 8 \overline{)368}$$

$$18. \quad 6 \overline{)462}$$

$$19. \quad 8 \overline{)896}$$

$$20. \quad 9 \overline{)1944}$$

$$21. \quad 320 \div 10$$

$$22. \quad 4600 \div 100$$

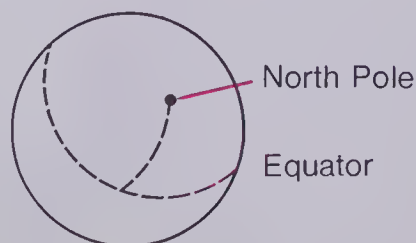
$$23. \quad 425 \div 10$$

$$24. \quad 65.4 \div 10$$

$$25. \quad 72.3 \div 10$$

History

1. The metric system was first introduced in France in 1793.
How many years ago is that?
2. Canada decided to “go metric” in 1970.
How many years was this after the introduction of the metre in France?
3. How did people agree on how long a metre should be?
They measured the distance from the North Pole to the Equator.
Then they divided this distance into 10 000 000 equal parts.
Each part they called one metre.



- (a) How many metres from the North Pole to the Equator?
- (b) How many metres in the distance around the world?



Using Decimals

$$2.173 \text{ m}$$

$$2 \text{ m} + 1 \text{ dm} + 7 \text{ cm} + 3 \text{ mm}$$

$$2 \text{ m} + 1 \text{ dm} + 7 \text{ cm} + 3 \text{ mm} = 2.173 \text{ m}$$

$$= 21.73 \text{ dm}$$

$$= 217.3 \text{ cm}$$

$$= 2173 \text{ mm}$$

Exercises

Write as (a) metres (b) decimetres (c) centimetres (d) millimetres.

1. $9 \text{ m} + 8 \text{ dm} + 6 \text{ cm} + 7 \text{ mm}$

3. $7 \text{ m} + 2 \text{ dm} + 0 \text{ cm} + 6 \text{ mm}$

5. $0 \text{ m} + 0 \text{ dm} + 0 \text{ cm} + 9 \text{ mm}$

7. $0 \text{ m} + 0 \text{ dm} + 0 \text{ cm} + 6 \text{ mm}$

2. $8 \text{ m} + 0 \text{ dm} + 1 \text{ cm} + 6 \text{ mm}$

4. $0 \text{ m} + 0 \text{ dm} + 1 \text{ cm} + 5 \text{ mm}$

6. $0 \text{ m} + 0 \text{ dm} + 2 \text{ cm}$

8. $0 \text{ m} + 6 \text{ dm}$

Write as (a) decimetres (b) centimetres (c) millimetres.

9. 2.541 m

10. 1.259 m

11. 4.067 m

12. 6.903 m

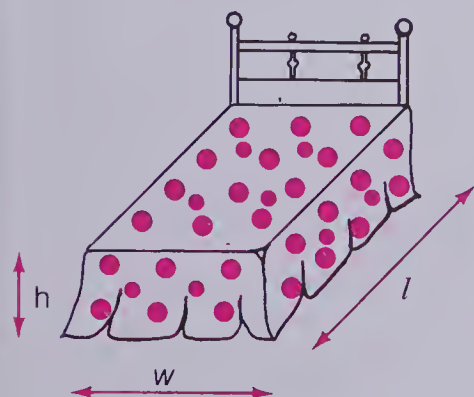
13. 1.001 m

14. 1.08 m

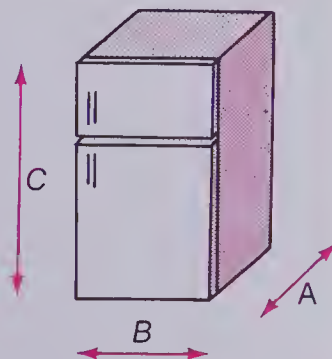
15. 0.04 m

16. 0.009 m

17. Estimate the dimensions in metres.

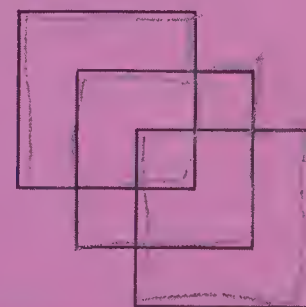


18. Estimate the dimensions in metres.



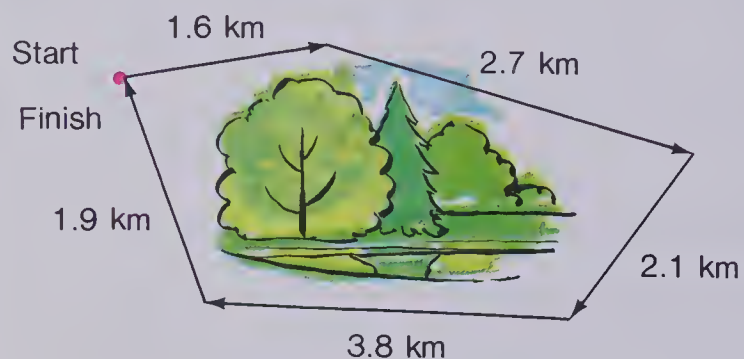
BRAINTICKLER

Draw the 3 squares with 1 continuous line without crossing any lines or lifting your pencil.



Perimeter

Martin hiked around the park.
His pedometer showed how far he walked.
How far did he walk?

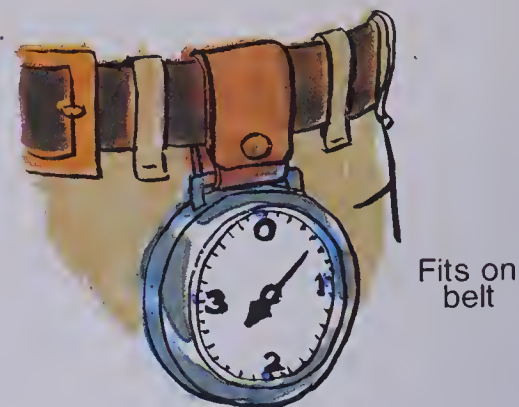


He walked 12.1 km.

Perimeter

1.6 km
2.7 km
2.1 km
3.8 km
1.9 km

12.1 km

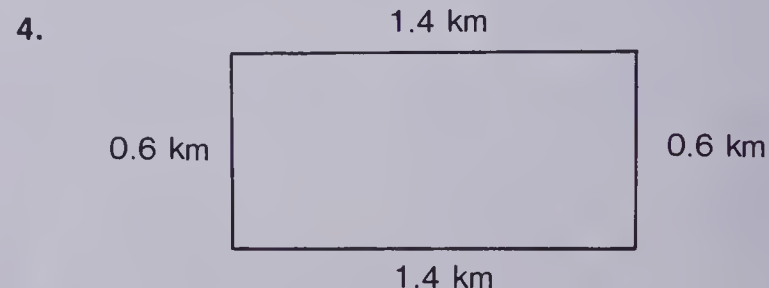
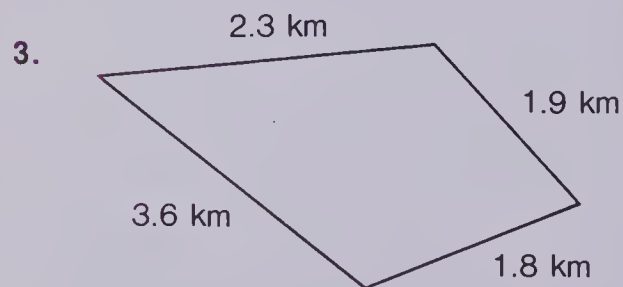
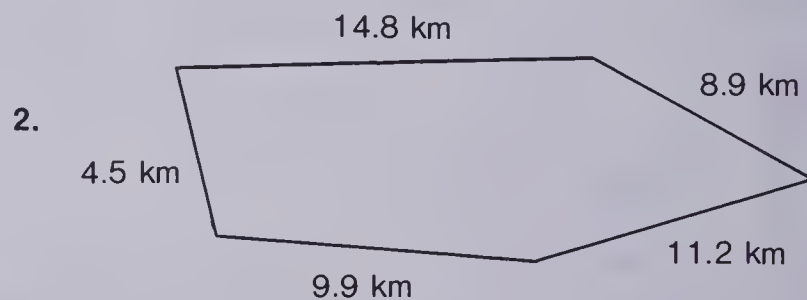
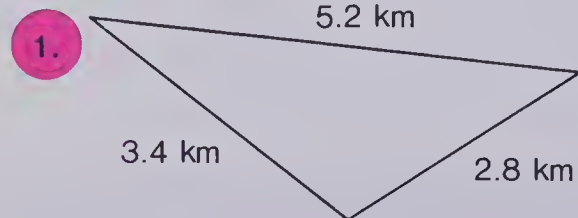


Pedometer
measures distance
walked in kilometres.

Perimeter is the distance around a shape.

Exercises

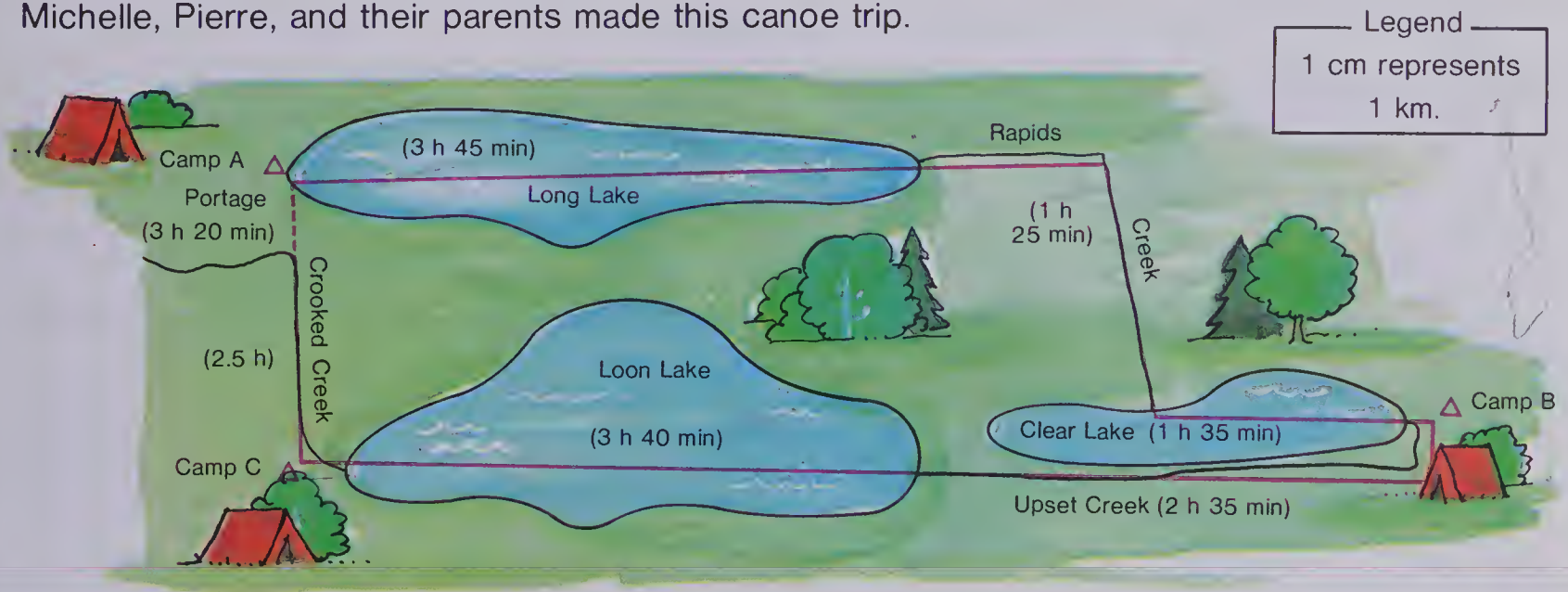
Find the perimeter.



- ★ 5. The length of a rectangle is 12.4 km.
The width is 7.6 km.
What is the perimeter?

A Canoe Trip

Michelle, Pierre, and their parents made this canoe trip.



Exercises

- Use the scale measure to find the length in kilometres of:
 - Long Lake
 - Rapids Creek
 - Upset Creek
 - Loon Lake
 - Crooked Creek
 - Portage.
- How long did it take to go from
 - Camp A to Camp B
 - Camp B to Camp C
 - Camp C to Camp A?
- Father carried the canoe.
180 kg of gear is carried by the other three.
On the average, how much does each of the three carry?
- Michelle caught three fish: 1.4 kg, 1.8 kg, 2.8 kg.
Pierre caught four fish: 1.1 kg, 1.4 kg, 1.2 kg, 1.6 kg.
Mother caught two fish: 3.6 kg, 1.8 kg.
Dad didn't catch any.
Who caught the most fish (in kilograms)?

Fishing Guide

Ian and Henri prepared for a fishing trip.



They took:

12 L of gasoline

300 mL of oil

oars

life jackets

6 cans of juice

(each 150 mL)

lunch

2 L of water

Exercises

1. Ian needs 12 L of gasoline.
Each can holds 4 L.
How many cans?
2. How many millilitres in each can?
 $1 \text{ L} = 1000 \text{ mL}$
 $4 \text{ L} = \blacksquare \text{ mL}$
3. Henri puts 20 mL of oil in each litre of gasoline.
How many millilitres of oil are in each can of gasoline?
4. How many millilitres of juice are they taking?
Are the 6 cans of juice more or less than 1 L?
How much more or less?
5. After the boat ride, Henri drove to the garage.
The car took 33.2 L of gasoline.
He got 10.6 L for the boat.
How many litres altogether?
6. Oil is sold in 500 mL cans.
Henri bought 4 L of oil.
How many cans?
7. Ian bailed the rain water out of the boat.
Each bail took out 500 mL.
He bailed 60 times.
How many litres altogether?
8. The boat motor uses 4 L of gasoline in 1 h.
How many litres of gasoline is needed for a 6.5 h trip?

Litres and Millilitres

$$1000 \text{ mL} = 1 \text{ L}$$

Millilitres to litres
divide by 1000.

$$3950 \text{ mL} = 3.95 \text{ L}$$

Litres to millilitres
multiply by 1000.

$$4.68 \text{ L} = 4680 \text{ mL}$$

Activity

Obtain a variety of cans and containers.
Estimate the capacity of each. Use appropriate units.
Check to see how close each estimate is.



Exercises

Copy and complete.

1. $1 \text{ mL} = 0.001 \text{ L}$
- 2 mL = L
- 15 mL = L
- 500 mL = L
- 1000 mL = L

2. $1 \text{ L} = 1000 \text{ mL}$
- 6 L = mL
- 0.5 L = mL
- 6.5 L = mL
- 9.5 L = mL

Change to millilitres.

3. 3.8 L
4. 1.75 L
5. 0.5 L
6. 1.25 L

Change to litres.

7. 4000 mL
8. 1700 mL
9. 3100 mL
10. 6000 mL

Which is the best buy?

11.



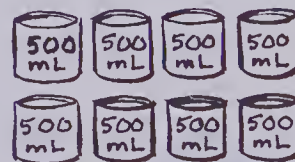
26¢ each

or



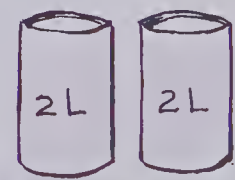
\$0.98

12.



32¢ each

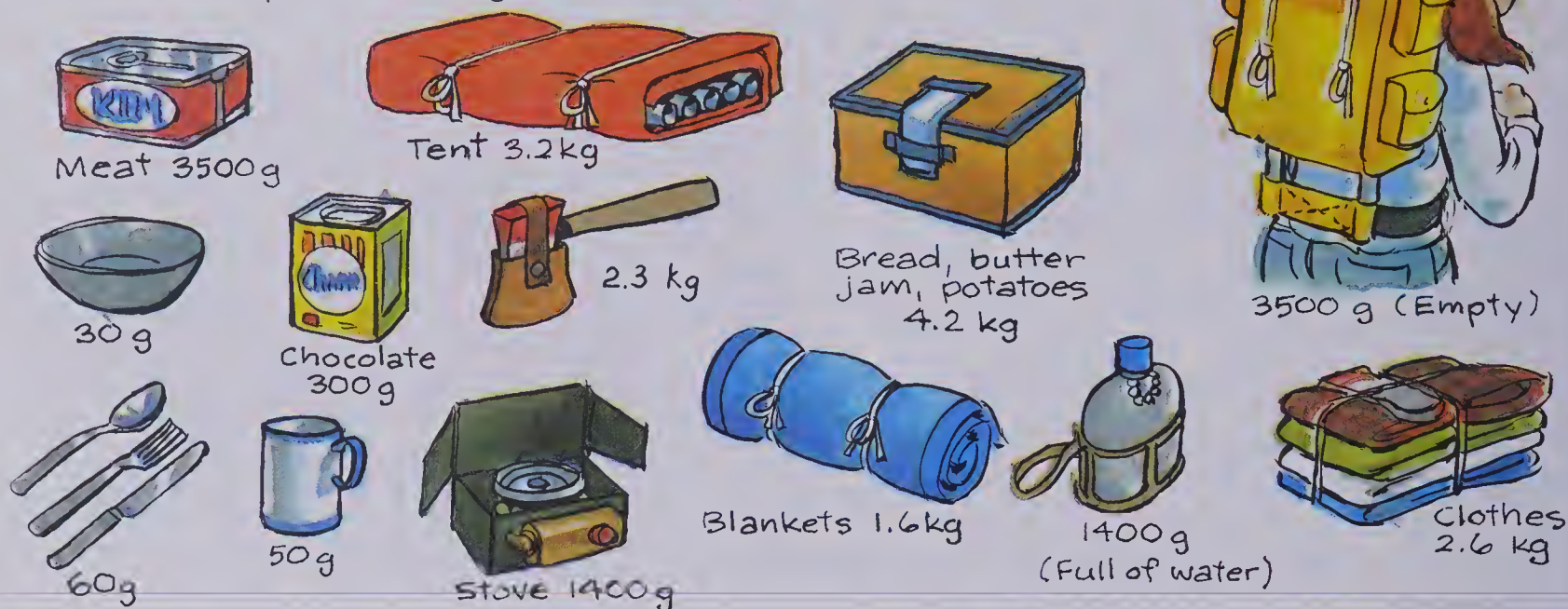
or



\$1.20 each

Kilograms and Grams

Sheila and Carol put these things in their backpacks.



$$1 \text{ kg} = 1000 \text{ g}$$

To change

kilograms to grams
multiply by 1000.

To change

grams to kilograms
divide by 1000.

Exercises

Change to kilograms.

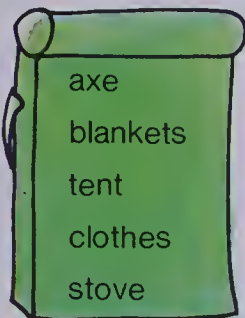
- | | | | |
|-----------|-----------|----------|----------|
| 1. 2500 g | 2. 1500 g | 3. 250 g | 4. 500 g |
| 5. 7500 g | 6. 2350 g | 7. 600 g | 8. 800 g |

Change to grams.

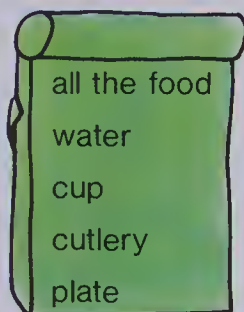
- | | | | |
|-----------|------------|-------------|------------|
| 9. 4 kg | 10. 1.5 kg | 11. 1.2 kg | 12. 2.8 kg |
| 13. 12 kg | 14. 0.5 kg | 15. 0.75 kg | 16. 0.1 kg |
17. Change the mass of each item in the backpacks to (a) grams (b) kilograms.

18. Carol is packing the backpacks.
Which way divides the mass most evenly?

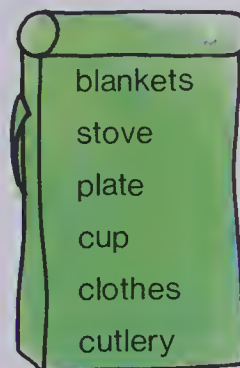
Carol's pack



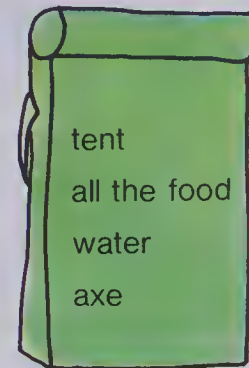
Sheila's pack



Carol's pack



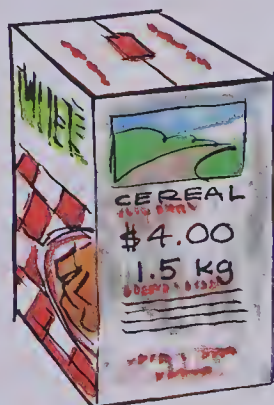
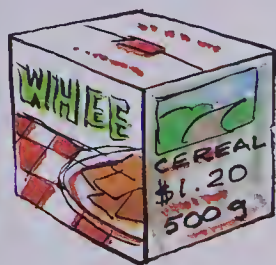
Sheila's pack



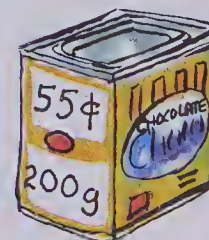
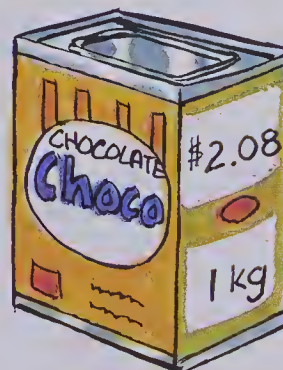
19. What is the mass of all the food, water, and stove in kilograms?
20. What is the mass of all the blankets, tent, and clothes in grams?

Choose the best buy.

21.



22.



Change to grams.

23. 4 kg 24. 11.2 kg 25. 26.3 kg 26. 0.3 kg

Change to kilograms.

27. 4000 g 28. 8300 g 29. 7050 g 30. 560 g

Activity

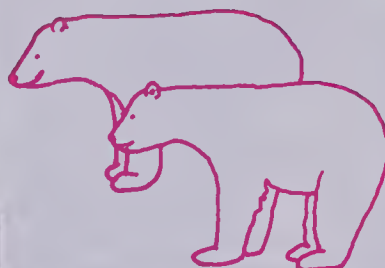
Collect 10 items. Estimate and check the mass of each item.





Tonnes

One Tonne



$$1 \text{ t (tonne)} = 1000 \text{ kg}$$

Exercises

1. A large moose is about 1 t. How many kilograms is this?
2. Two bears have a mass of about 1 t. About how many kilograms is each bear?
3. Twenty-eight students together have a mass of about 1 t.
About how many kilograms is each person (to nearest whole number)?

Change to tonnes.

4. $1\ 000 \text{ kg} = \blacksquare \text{ t}$
 $2\ 000 \text{ kg} = \blacksquare \text{ t}$
 $2\ 400 \text{ kg} = \blacksquare \text{ t}$
 $10\ 000 \text{ kg} = \blacksquare \text{ t}$
5. $1000 \text{ kg} = \blacksquare \text{ t}$
 $1500 \text{ kg} = \blacksquare \text{ t}$
 $500 \text{ kg} = \blacksquare \text{ t}$
 $750 \text{ kg} = \blacksquare \text{ t}$

Change to kilograms.

6. $1 \text{ t} = \blacksquare \text{ kg}$
 $2 \text{ t} = \blacksquare \text{ kg}$
 $18 \text{ t} = \blacksquare \text{ kg}$
 $2.5 \text{ t} = \blacksquare \text{ kg}$
7. $1 \text{ t} = \blacksquare \text{ kg}$
 $1.5 \text{ t} = \blacksquare \text{ kg}$
 $0.5 \text{ t} = \blacksquare \text{ kg}$
 $0.25 \text{ t} = \blacksquare \text{ kg}$

8. What is the approximate mass of a large horse? a large bull?
9. Choose the most reasonable estimate.

5 football players

- (a) 1 t
- (b) 500 kg
- (c) 5 t

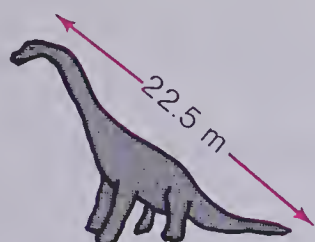
Compact car

- (a) 1 t
- (b) 500 kg
- (c) 5 t

Elephant

- (a) 1 t
- (b) 500 kg
- (c) 5 t

Dinosaurs



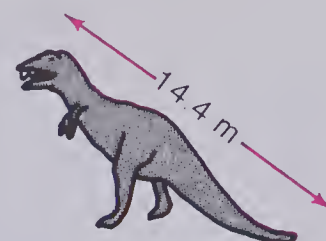
78.5 t

Brachiosaurus
(arm-lizard)



40.2 t

Brontosaurus
(thunder beast)



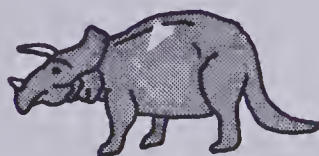
6.7 t

Tyrannosaurus
(tyrant)



1.7 t

Stegosaurus
(plated reptile)



8.8 t

Triceratops
(three-horned face)



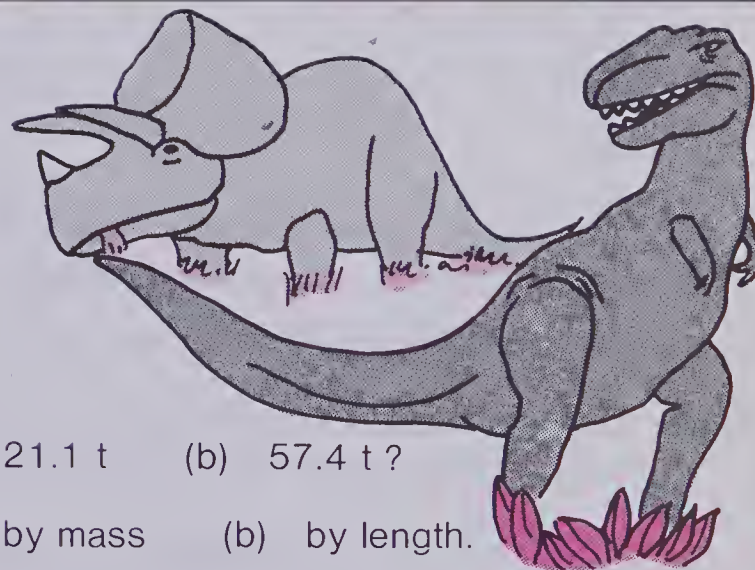
10.6 t

Diplodocus
(double beak)

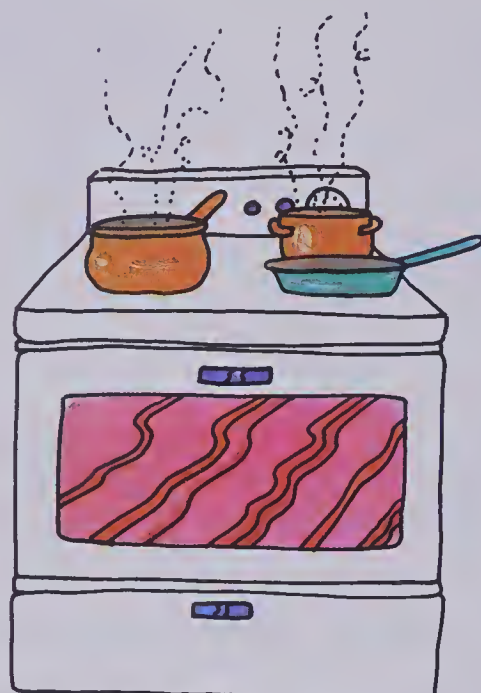
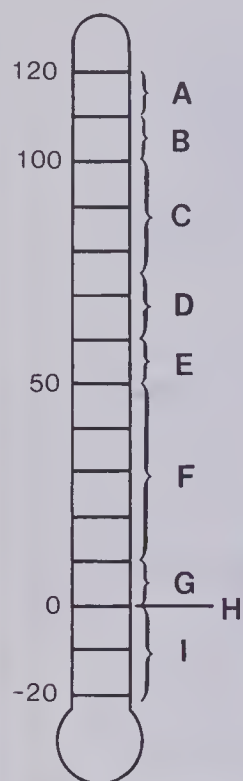
Exercises

What is the difference in mass?

- Brachiosaurus and Stegosaurus
- Tyrannosaurus and Diplodocus
- Brontosaurus and Triceratops
- Which two dinosaurs have a combined mass of
(a) 19.4 t (b) 41.9 t (c) 118.7 t?
- Which dinosaurs together have a mass of (a) 21.1 t (b) 57.4 t?
- List the dinosaurs from largest to smallest (a) by mass (b) by length.
- Which two dinosaurs differ in length by 12.1 m?
- Was Brachiosaurus more or less than 8 times as heavy as Diplodocus?
- Which dinosaurs have a combined length of
(a) 31.5 m (b) 40.9 m (c) 60.5 m?



The Importance of Temperature



Food Temperature

A — Canning temperature
short cooking time

B — Canning temperature
long cooking time

C — Cooking temperature

D — Warming temperature

E — Warm

F — DANGER ZONE

G — Cool

H — Cold

I — Freezing

Concern about Bacteria

— destroys most bacteria

— allows survival of bacteria

— some bacteria growth

— rapid growth of bacteria

— Safe zone BUT certain
bacteria may grow if food
is stored too long.
Food spoilage may occur.

— Stops bacteria growth.

Bacteria may survive.

Foods can spoil if stored
too long.

Temperatures colder than
0°C are read as
“minus ten” (-10).

Exercises

- Give the higher and lower temperatures of each category.
 - Canning with short cooking time
 - Cooking temperature
 - DANGER ZONE
 - Freezing
- How many degrees difference is there between the low temperature of the cooking temperature and the high temperature of the DANGER ZONE?
- How many degrees difference is there between the high temperature of the DANGER ZONE and the low temperature of the cool range?
- Check a refrigerator. What is the temperature at which foods are kept?
Is it in the safe range?
- Why should food not be kept too long in a refrigerator?

Average Temperatures

			Months											
			Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Cities	Halifax	Max.	0	-0.5	3.3	8.3	14.4	19.4	23.3	22.7	19.4	13.8	8.3	2.2
		Min.	-8.3	-8.8	-4.4	0	5	9.4	13.3	13.8	10.5	6.1	1.1	-5
	Toronto	Max.	-0.5	-0.5	3.9	11.1	18.3	23.9	27.2	25.5	21.6	14.4	7.2	1.1
		Min.	-7.7	-8.3	-4	3.8	7.7	13.3	18.9	15.6	11.7	5.5	0.6	-5
	Edmonton	Max.	-10.5	-6.1	-1	9.3	17.3	21.1	22.9	22.3	17.6	11.8	0	-5.1
		Min.	-16.1	-15.8	-9.1	-1.9	5.2	8.9	12.8	10.5	5.1	0	-8.3	-15
	Whitehorse	Max.	-13.8	-8.8	-2.2	5	13.8	19.4	19.4	18.3	12.7	5	-5	-11.1
		Min.	-22.2	-16.6	-13.3	-5.5	1.1	6.1	7.2	6.1	2.8	-2.2	-11.7	-16.7

Exercises

- What is the average maximum temperature in Halifax in
(a) March (b) August (c) December?
- What is the average minimum temperature in Whitehorse in
(a) June (b) September (c) January?
- In what months are the average maximums below freezing (minus readings such as -8.3) in Whitehorse?
- What is the highest average monthly maximum in Toronto? in Whitehorse? in Edmonton?
- What is the lowest average monthly minimum in Whitehorse? in Halifax? in Toronto?
- What is the difference in the average monthly maximum and minimum in Toronto in
(a) June (b) August ★(c) November ★(d) January?
- What is the difference in the average monthly maximum and minimum in Edmonton in
(a) May (b) July ★(c) November ★(d) December?

Time



60 s in 1 min
60 min in 1 h
24 h in 1 d

7 d in 1 week
52 weeks in 1 a (year)
365 d in 1 a (year)
(Leap year has 366 d.)

Exercises

Copy and complete.

1. 24 h = ■ min
7 d = ■ h
1 week = ■ h

2. 1 a = ■ h
1 d = ■ min
1 h = ■ s

3. 192 h = ■ d
105 d = ■ weeks
1800 s = ■ min

4. 1 d = ■ h
= ■ min
= ■ s

5. 1 week = ■ d
= ■ h
= ■ min
= ■ s

6. 1 a = ■ d
= ■ h
= ■ min
= ■ s

7. Alphonse watches TV about 45 min each day.
How many minutes does he watch TV
(a) each week? (b) each year?

8. Yvonne watches TV about 840 min each week.
(a) How many minutes a day is this?
(b) How many minutes a year is this?

9. Each school day Dina has 15 min recess twice a day.
How many minutes a week is this?
(Careful! How many days in a school week?)

10. Alphonse celebrated his 11th birthday.
How many days old is he?

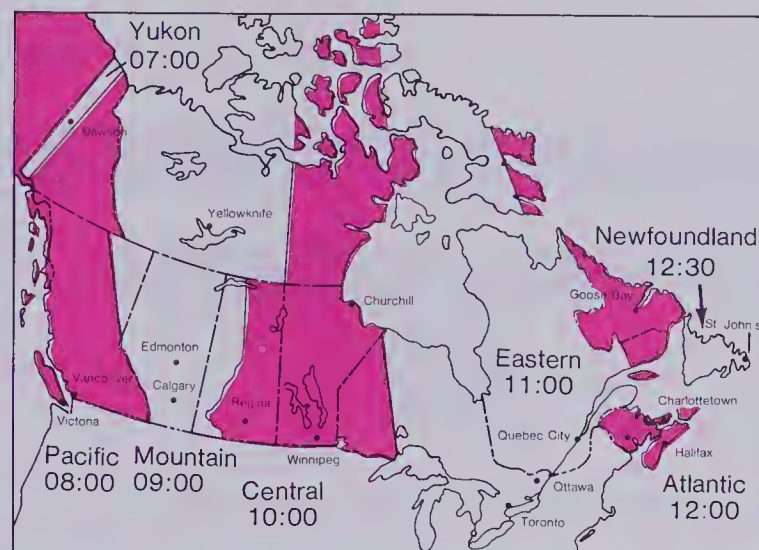
11. Yvonne watches about 2 half hour TV programs a day.
How many hours a year is this?

12. Marco trains for gymnastics 15 h each day.
How many hours a year is this?

13. Guy trains 2.5 h each day.
He trains every day.
How many hours a year does Guy train?

14. Guy, a long distance runner, was timed on his first lap.
He ran a kilometre in 240 s.
At this rate, how far can he run in 1 h?

Standard Time Zones



When it is 04:00 in Vancouver it is 08:00 in Halifax.

Exercises

- When it is 12:00 in Goose Bay, what time is it in
 (a) Regina (b) Dawson (c) Winnipeg (d) Toronto?
- When it is 09:00 in Edmonton, what time is it in
 (a) Victoria (b) Winnipeg (c) Toronto (d) St. John's?
- When it is 12:30 in St. John's, what time is it in
 (a) Halifax (b) Toronto (c) Vancouver (d) Goose Bay?
- How much faster than Atlantic time is Newfoundland time?
- Copy this chart which represents the 7 time zones.

It is 18:00 in the Central Zone.

Name the zones and write the times in each.

West	Yukon			18:00				East
				Central				
				Zone				


- Copy this chart of the time zones. Label and show the times.

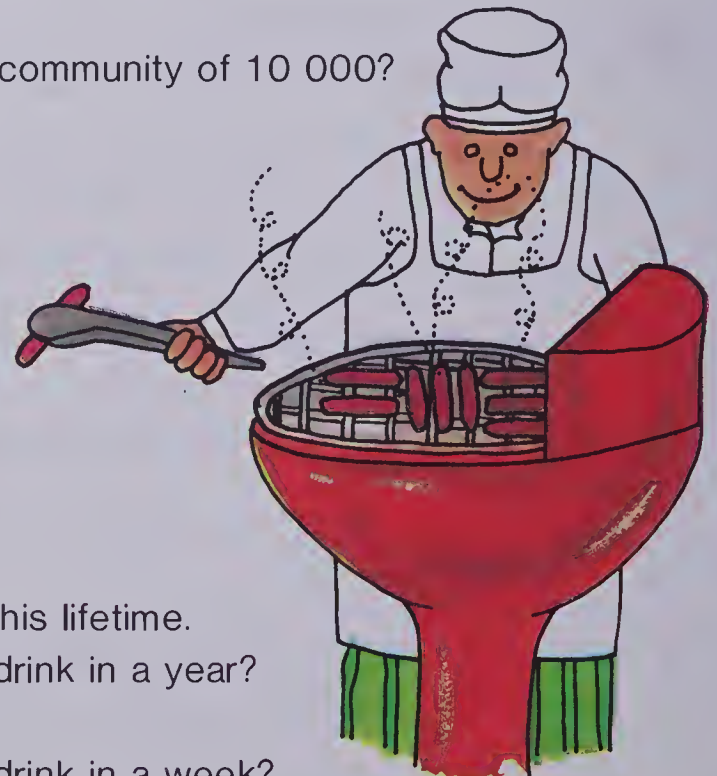
West		16:00					East
		Pacific					

Solving Problems

1. How many centimetres (to nearest tenth) longer is pencil A than pencil B?



- Each person eats about 49 kg of beef a year.
How much does a family of 5 eat in a year?
 - It is said that a lifetime is “three score and ten” years.
A score is 20.
How long is a lifetime?
 - A cow provides an average of 12 L of milk per day.
How many days are required to produce 2800 L?
 - In a city, the average number of litres of water used per person per day is 650.
How many litres of water for
(a) a family of 4
(b) a community of 10 000?
 - There were 20 kg of wieners at a wiener roast.
Class A ate 5.6 kg of wieners.
Class B ate 4.8 kg of wieners.
Class C ate 7.1 kg of wieners.
How many kilograms of wieners were left over?
 - Slot cars are exciting.
Margo’s car made 1 lap in 15 s.
How many laps in 1 min?
 - The “average” Canadian drinks 2800 L of milk in his lifetime.
(a) How many litres does the average Canadian drink in a year?
(Use the answer to Exercise 3.)
(b) How many litres does the average Canadian drink in a week?
- 



Estimating

Martin estimated the length of the car.

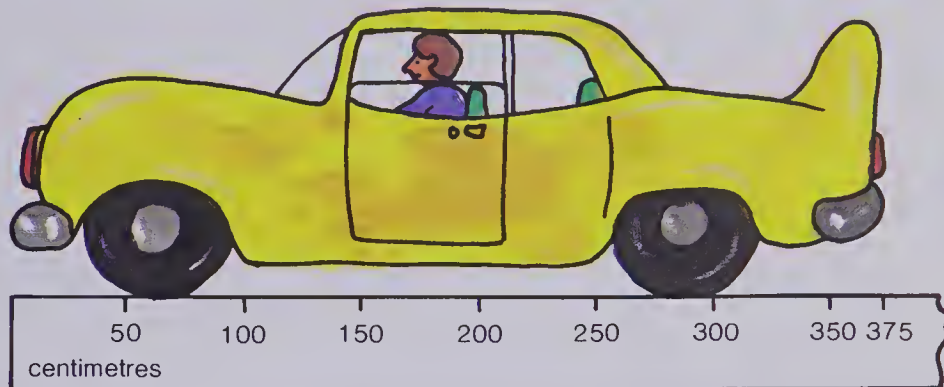
He estimated 4 m.

Martin measured the car.

Length: 375 cm

3.75 m

His estimate was reasonable.



Activity

1. Estimate, then measure the length and width in metres of
 - (a) your school
 - (b) the hall outside your classroom.
2. Estimate, then measure the length and width in centimetres of
 - (a) a double sheet of newspaper
 - (b) a window in your room.
3. (a) Estimate the length of your teacher's car in
 - (i) centimetres
 - (ii) metres.
 - (b) Check by measuring in centimetres. Convert to metres.
4. (a) Estimate the length of a bicycle in
 - (i) centimetres
 - (ii) metres.
 - (b) Check by measuring in centimetres. Convert to metres.
5. (a) Estimate the length of the school ground in
 - (i) metres
 - (ii) hectometres.
 - (b) Check by measuring in metres. Convert to hectometres.
6. (a) Estimate the distance around your school ground in
 - (i) metres
 - (ii) hectometres
 - (iii) kilometres.
 - (b) Check by measuring in metres.



Chapter Test

Divide.

1. $6000 \div 100$

2. $486 \div 10$

3. $10 \div 1$

4. $567 \div 1000$

5. $6 \overline{)72}$

6. $4 \overline{)64}$

7. $3 \overline{)711}$

8. $7 \overline{)945}$

Multiply.

9. 50×0.1

10. 470×0.01

11. 57×0.1

12. 6938×0.01

Copy and complete.

13. $100 \text{ cm} = \blacksquare \text{ dm}$

14. $250 \text{ cm} = \blacksquare \text{ dm}$

15. $1 \text{ km} = \blacksquare \text{ hm}$

16. $320 \text{ hm} = \blacksquare \text{ km}$

17. $1000 \text{ mL} = \blacksquare \text{ L}$

18. $3 \text{ t} = \blacksquare \text{ kg}$

19. $1 \text{ km} = \blacksquare \text{ m}$

20. $1 \text{ cm} = \blacksquare \text{ mm}$

21. Write as centimetres.

$2 \text{ m} + 3 \text{ dm} + 1 \text{ cm} + 0 \text{ mm}$

22. Write as decimetres.

$4 \text{ m} + 0 \text{ dm} + 7 \text{ cm} + 8 \text{ mm}$

23. The Senior bicycle is 130 cm tall.
The Junior bicycle is 1.1 m tall.
How many centimetres taller is
the Senior bicycle?

24. Fernando worked 6 h a week doing
yard work.
At this rate, how many hours a year
does he work?

25. Jose estimated the height of the
stove to be 1.2 m.
Millie estimated the height to
be 0.9 m.
The actual height is 99 cm.
Whose estimate is the closest?

26. The temperature at 07:20 was 6.3°C .
At 14:20 the temperature was 24.1°C .
How many degrees did the temperature
rise?

27. How many seconds in 3 min?

28. Estimate the length in metres
of your classroom.

Cumulative Review

1. Complete the table.

Enter	Display
99	88
76	65
50	39
48	■
35	■
17	■

What is the rule?

2. Compare. Use $<$, $=$, or $>$.

(a) $429.72 \bullet 429.67$

(b) $5203.6 \bullet 6230.2$

3. Add.

(a) 4061.03

$+2399.96$

(b) $464\ 176$

$+322\ 903$

(c) 283

14

165

$+ 72$

4. Subtract.

(a) 625

$- 98$

(b) 4031

-1999

(c) $710\ 134$

$-200\ 469$

(d) 5600.03

-2032.16

5. Multiply.

(a) 169

$\times 0.7$

(b) 621

$\times .23$

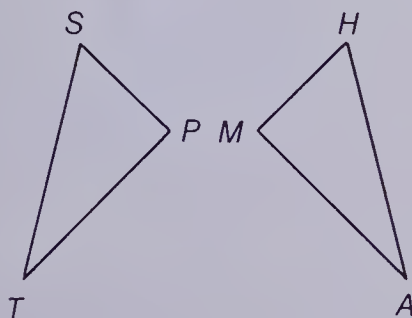
(c) 316.2

$\times 6$

(d) 141.21

$\times 0.5$

6. Name the matching vertices in these congruent shapes.



7. Write a number for each.

(a) one million, five hundred sixty-eight thousand

(b) 9 thousands, 0 hundreds, 8 tens, 5 ones, 4 tenths

(c) $30\ 000 + 1000 + 600 + 10 + 4 + 0.2 + 0.09$

8. Complete.

(a) $3.8\text{ m} = \blacksquare\text{ cm}$

$219\text{ cm} = \blacksquare\text{ m}$

(b) $5\text{ kg} = \blacksquare\text{ g}$

$8000\text{ g} = \blacksquare\text{ kg}$

(c) $2417\text{ mL} = \blacksquare\text{ L}$

$3.6\text{ L} = \blacksquare\text{ mL}$

Chapter 5

Division and Measurement

Two-digit Divisors
Area and Volume



Division Puzzles

To find the hidden message:

(a) Work each question. (b) In your notebook write the letter which matches each answer.

- | | | | | |
|------------------|-------------------|-----------------|------------------|-----------------|
| W | C | H | N | |
| 1. $35 \div 7$ | 2. $18 \div 3$ | 3. $24 \div 6$ | 4. $14 \div 7$ | |
| R | A | T | L | |
| 5. $81 \div 9$ | 6. $180 \div 6$ | 7. $200 \div 5$ | 8. $70 \div 2$ | |
| V | S | D | I | |
| 9. $560 \div 7$ | 10. $100 \div 10$ | 11. $32 \div 4$ | 12. $48 \div 2$ | |
| G | O | E | Y | K |
| 13. $720 \div 8$ | 14. $500 \div 10$ | 15. $36 \div 3$ | 16. $420 \div 7$ | 17. $30 \div 2$ |

12 35 12 6 40 9 24 6 24 40 60
 5 30 10 30 10 4 50 6 15 24 2 90
 8 24 10 6 50 80 12 9 60

Complete the division to find the punch line!

- | | | | |
|------------------------|------------------------|-------------------------|-------------------------|
| W | A | N | P |
| 1. $3 \overline{)72}$ | 2. $4 \overline{)68}$ | 3. $6 \overline{)210}$ | 4. $5 \overline{)185}$ |
| I | U | E | T |
| 5. $4 \overline{)944}$ | 6. $8 \overline{)976}$ | 7. $6 \overline{)1944}$ | 8. $5 \overline{)1230}$ |

Passer-by: You must be very brave to come down in a parachute during a windstorm like this!

Stranger: I didn't come down in a parachute,

236 24 324 35 246 122 37
 236 35 17 246 324 35 246 !

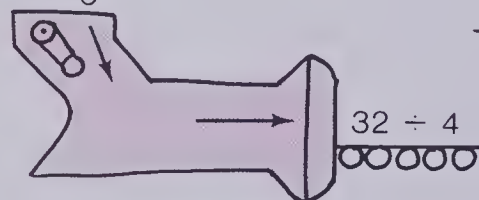


The Zero Zapper

David uses the zero zapper to help solve this problem.

$$320 \div 40$$

$$320 \div 40$$



The zero zapper gives a related fact.



David knows this related fact: $32 \div 4 = 8$

He writes: $320 \div 40 = 8$

Can you explain how the zero zapper works?

Exercises

Think: about the related fact for each problem, then complete the division sentence.

1. $350 \div 70$



Think:

$$35 \div 7 = 5$$

$$350 \div 70 = \blacksquare$$

2. $480 \div 60$

3. $400 \div 50$

4. $180 \div 30$

5. $210 \div 70$

6. $420 \div 70$

7. $240 \div 80$

8. $360 \div 60$

9. $270 \div 90$

10. $640 \div 80$

11. $300 \div 60$

12. $250 \div 50$

13. $560 \div 70$

14. $280 \div 40$

15. $360 \div 90$

16. $20 \overline{)120}$



Think:

$$2 \overline{)12} \quad \blacksquare$$

$$20 \overline{)120}$$

17. $60 \overline{)180}$

18. $60 \overline{)240}$

19. $90 \overline{)810}$

20. $70 \overline{)420}$

21. $80 \overline{)560}$

22. $50 \overline{)450}$

23. $60 \overline{)480}$

24. $80 \overline{)400}$

25. $30 \overline{)240}$

26. $90 \overline{)630}$

★ 27. $3500 \div 700$

★ 28. $400 \overline{)3200}$

★ 29. $4000 \div 800$

★ 30. $6300 \div 700$

Multiples of 10

Cindy knows how to use related facts.

$$60 \div 30 = 6 \div 3$$

$$80 \div 20 = 8 \div 2$$

She is given this division problem.

$$60 \overline{)420}$$

She thinks:
$$\begin{array}{r} 7 \\ 6 \overline{)42} \end{array}$$

She writes:
$$\begin{array}{r} 7 \\ 60 \overline{)420} \\ \underline{420} \\ 0 \end{array}$$



Exercises

Write a related fact for each.

1. $30 \overline{)120}$

$3 \overline{)12}$

2. $50 \overline{)150}$

3. $8 \overline{)400}$

4. $2 \overline{)160}$

5. $70 \overline{)210}$

6. $40 \overline{)280}$

7. $6 \overline{)300}$

Complete.

8. $50 \overline{)350}$ Related fact: $5 \overline{) \square \square}$

Solution:
$$\begin{array}{r} \square \\ 50 \overline{)350} \\ \underline{\square \square \square} \\ \square \end{array}$$

9. $90 \overline{)720}$ Related fact: $9 \overline{) \square \square}$

Solution:
$$\begin{array}{r} \square \\ 90 \overline{)720} \\ \underline{\square \square \square} \\ \square \end{array}$$

Divide. Use related facts.

10. $40 \overline{)240}$

11. $60 \overline{)420}$

12. $40 \overline{)200}$

13. $70 \overline{)280}$

14. $90 \overline{)360}$

15. $50 \overline{)400}$

16. $30 \overline{)270}$

17. $40 \overline{)160}$

18. $60 \overline{)180}$

19. $70 \overline{)350}$

20. $30 \overline{)180}$

21. $80 \overline{)640}$

Using Multiples of 10 to Divide

Divide. $32 \overline{)192}$

Brenda rounds down the numbers to multiples of 10: $30 \overline{)190}$

She thinks of a related division question:

$$3 \overline{)19}$$

She estimates:

$$\begin{array}{r} 6 \\ 3 \overline{)19} \end{array}$$

She uses this estimate in the original question:

$$\begin{array}{r} 6 \\ 32 \overline{)192} \\ \underline{192} \\ 0 \end{array}$$



Exercises

Complete.

1. $41 \overline{)287}$

She thinks:

Round: $\square\square \overline{) \square\square\square}$

Related question: $\triangle \overline{) \triangle \triangle}$

She writes:

$$\begin{array}{r} \square \\ 41 \overline{)287} \\ \underline{\square\square\square} \\ \square \end{array}$$

2. $23 \overline{)138}$

She thinks:

Round: $\square\square \overline{) \square\square\square}$

Related question: $\triangle \overline{) \triangle \triangle}$

She writes:

$$\begin{array}{r} \square \\ 23 \overline{)138} \\ \underline{\square\square\square} \\ \square \end{array}$$

Divide.

3. $32 \overline{)224}$

4. $45 \overline{)315}$

5. $51 \overline{)204}$

6. $43 \overline{)344}$

7. $64 \overline{)320}$

8. $22 \overline{)176}$

9. $34 \overline{)238}$

10. $73 \overline{)292}$

Using Estimates

Brendan uses fewer steps by estimating.

He works with this problem.

$$448 \div 64$$

Write:

$$\begin{array}{r} 7 \\ 64 \overline{)448} \\ \underline{448} \\ 0 \end{array}$$

$$448 \div 64 = 7$$



Step 1. Brendan estimates using the related fact.

$$\begin{array}{r} 6 \overline{)44} \text{ is about } 7. \\ (6 \times 7 = 42) \end{array}$$

Exercises

Help Brendan to complete these.

1. $432 \div 54$

Write:

$$\begin{array}{r} \blacksquare \\ 54 \overline{)432} \\ \underline{\blacksquare\blacksquare\blacksquare} \\ \blacksquare \end{array}$$

Think:

Step 1. Estimate.

$$\begin{array}{r} 5 \overline{)43} \text{ is about } \blacksquare. \\ (5 \times \blacksquare = \blacksquare\blacksquare) \end{array}$$

2. $188 \div 47$

Write:

$$\begin{array}{r} \blacksquare \\ 47 \overline{)188} \\ \underline{\blacksquare\blacksquare\blacksquare} \\ \blacksquare \end{array}$$

Think:

Step 1. Estimate.

$$\begin{array}{r} \blacksquare \overline{)\blacksquare\blacksquare} \text{ is about } \blacksquare. \\ (\blacksquare \times \blacksquare = \blacksquare\blacksquare) \end{array}$$

Divide.

3. $43 \overline{)258}$

7. $22 \overline{)154}$

11. $35 \overline{)175}$

15. $72 \overline{)432}$

19. $51 \overline{)357}$

4. $21 \overline{)168}$

8. $45 \overline{)135}$

12. $57 \overline{)228}$

16. $41 \overline{)328}$

20. $82 \overline{)410}$

5. $37 \overline{)148}$

9. $33 \overline{)165}$

13. $48 \overline{)144}$

17. $73 \overline{)365}$

21. $68 \overline{)204}$

6. $53 \overline{)265}$

10. $62 \overline{)248}$

14. $62 \overline{)496}$

18. $43 \overline{)387}$

22. $32 \overline{)288}$

Adjusting Estimates

Sometimes an estimate is too large.
Sandy is working with this problem.

$$234 \div 39$$

Write:

$$\begin{array}{r} 7 \\ 39 \overline{)234} \\ \underline{273} \end{array}$$

Can't subtract!

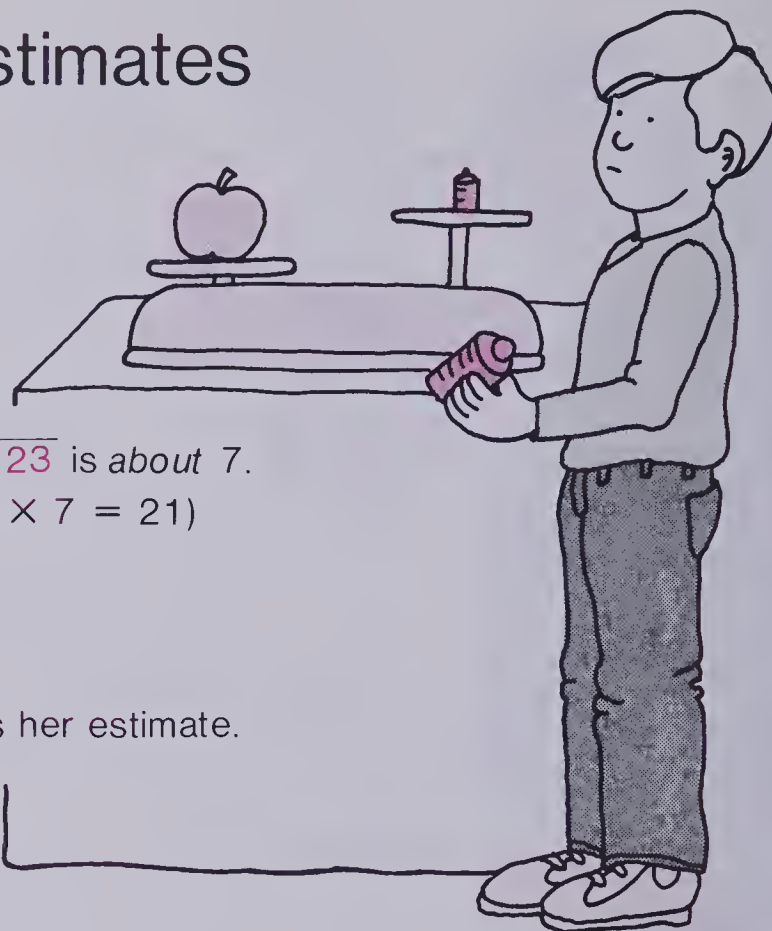
$$\begin{array}{r} 6 \\ 39 \overline{)234} \\ \underline{234} \\ 0 \end{array}$$

$$234 \div 39 = 6$$

Think:

Step 1. Estimate. $3 \overline{)23}$ is about 7.
($3 \times 7 = 21$)

Step 2. Sandy lowers her estimate.
She tries 6.



Exercises

Use the estimate provided. Adjust the estimate *if necessary*, then complete the division problem.

1. Write: $266 \div 38$

$$\begin{array}{r} 8 \\ 38 \overline{)266} \\ ? \end{array}$$

Think:

Estimate.
 $3 \overline{)26}$ is about 8.
($3 \times 8 = 24$)

2. Write: $344 \div 43$

$$\begin{array}{r} 8 \\ 43 \overline{)344} \\ ? \end{array}$$

Think:

Estimate.
 $4 \overline{)34}$ is about 8.
($4 \times 8 = 32$)

Divide. Some estimates will need adjustment, others will not.

3. $58 \overline{)464}$

7. $78 \overline{)312}$

11. $45 \overline{)225}$

15. $87 \overline{)783}$

4. $64 \overline{)448}$

8. $69 \overline{)483}$

12. $79 \overline{)237}$

16. $48 \overline{)288}$

5. $87 \overline{)435}$

9. $57 \overline{)456}$

13. $29 \overline{)116}$

17. $78 \overline{)546}$

6. $27 \overline{)135}$

10. $67 \overline{)201}$

14. $36 \overline{)252}$

18. $33 \overline{)297}$

Extending Division

Sandy works with 2-digit quotients too.

Remember: estimates are sometimes too large!

Write:

$$\begin{array}{r} 9 \\ 45 \overline{) 3735} \\ \underline{405} \end{array}$$

Can't subtract!

$$\begin{array}{r} 8 \\ 45 \overline{) 3735} \\ \underline{360} \\ 135 \end{array}$$

$$\begin{array}{r} 83 \\ 45 \overline{) 3735} \\ \underline{360} \\ 135 \\ \underline{135} \\ 0 \end{array}$$

$$3735 \div 45$$

Step 1.

Think:

Estimate.

$4 \overline{) 37}$ is about 9.

$$(4 \times 9 = 36)$$

Step 2.

Lower estimate.

Try 8.

Step 3.

$4 \overline{) 13}$ is about 3.

$$(4 \times 3 = 12)$$

$$3735 \div 45 = 83$$

Exercises

Divide. Some estimates will need adjustment.

1. $36 \overline{) 1836}$

2. $48 \overline{) 1296}$

3. $46 \overline{) 1104}$

4. $58 \overline{) 2668}$

5. $39 \overline{) 2028}$

6. $66 \overline{) 2442}$

7. $45 \overline{) 1170}$

8. $53 \overline{) 1378}$

9. $73 \overline{) 2117}$

10. $41 \overline{) 1312}$

11. $81 \overline{) 3645}$

12. $27 \overline{) 1701}$

13. $35 \overline{) 2240}$

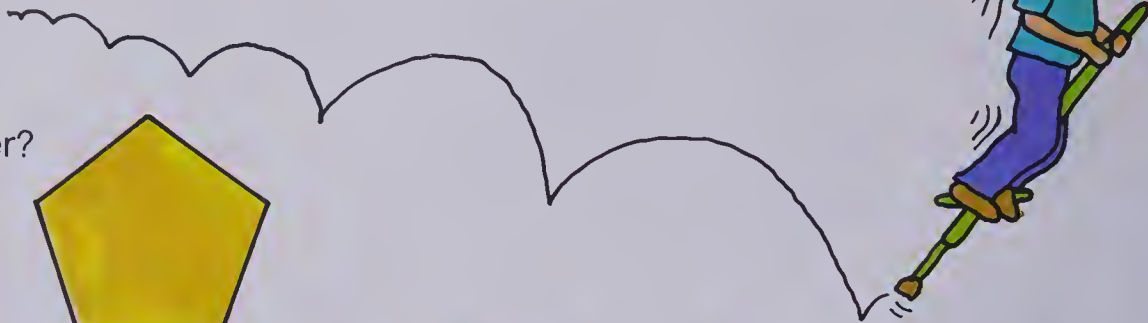
14. $31 \overline{) 1178}$

15. $67 \overline{) 2747}$

16. $75 \overline{) 1650}$

Mini-Stories

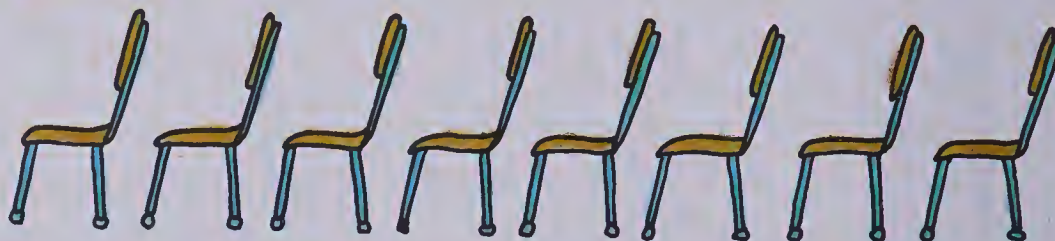
1. Pogo stick championships.
3276 cm course.
52 cm for each jump.
How many jumps altogether?



2. Pentagon.
5 equal sides.
Perimeter is 130 cm.
How long is each side?



3. School play.
20 chairs in each row.
340 chairs altogether.
How many rows of chairs?



4. Assembly line.
Each car needs 4 wheel covers.
948 wheel covers.
How many cars?



5. Merry-go-round factory.
27 wooden horses for each merry-go-round.
216 wooden horses.
How many merry-go-rounds?



6. Empty bottle return.
768 empty bottles.
24 bottles in a case?
How many cases?



- ★7. Weightlifter.
116 kg is total mass lifted.
The bar has a mass of 4 kg.
Equal iron masses on each side.
How many kilograms on each side?



Extending Estimates

The digits used for estimates will vary.

Notice Dianne's estimates as she works through these two examples.

$$884 \div 34$$

Write:

Think:

Estimate.

$$\begin{array}{r} 26 \\ 34 \overline{) 884} \\ \underline{68} \\ 204 \\ \underline{204} \\ 0 \end{array} \quad \dots \quad 3 \overline{) 8} \text{ is about } 2.$$

$$\dots \quad 3 \overline{) 20} \text{ is about } 6.$$

$$7378 \div 34$$

Write:

Think:

Estimate.

$$\begin{array}{r} 217 \\ 34 \overline{) 7378} \\ \underline{68} \\ 57 \\ \underline{34} \\ 238 \\ \underline{238} \\ 0 \end{array} \quad \dots \quad 3 \overline{) 7} \text{ is about } 2.$$

$$\dots \quad 3 \overline{) 5} \text{ is about } 1.$$

$$\dots \quad 3 \overline{) 23} \text{ is about } 7.$$



Handwritten notes: 2413, 28, 12065, 826, 25, 25, 7, 15

Exercises

Complete.

1.
$$\begin{array}{r} 3\blacksquare \\ 24 \overline{) 768} \\ \underline{72} \\ \blacksquare 8 \\ \underline{} \\ \blacksquare \blacksquare \\ \underline{} \\ \blacksquare \end{array} \quad \dots \quad 2 \overline{) 7} \text{ is about } 3.$$

$$\dots \quad 2 \overline{) \blacksquare} \text{ is about } \blacksquare.$$

2.
$$\begin{array}{r} 14\blacksquare \\ 26 \overline{) 3692} \\ \underline{26} \\ 109 \\ \underline{} \\ \blacksquare \blacksquare \blacksquare \\ \underline{} \\ \blacksquare 2 \\ \underline{} \\ \blacksquare \blacksquare \\ \underline{} \\ \blacksquare \end{array} \quad \dots \quad 2 \overline{) 3} \text{ is about } 1.$$

$$\dots \quad 2 \overline{) 10} \text{ is } 5.$$

(Why was 4 used?)

$$\dots \quad 2 \overline{) \blacksquare} \text{ is about } \blacksquare.$$

Divide.

3. $21 \overline{) 735}$

4. $32 \overline{) 832}$

5. $23 \overline{) 943}$

6. $41 \overline{) 656}$

7. $34 \overline{) 884}$

8. $42 \overline{) 966}$

9. $24 \overline{) 792}$

10. $32 \overline{) 512}$

11. $24 \overline{) 3216}$

12. $27 \overline{) 8775}$

13. $41 \overline{) 6683}$

14. $35 \overline{) 7490}$

15. $23 \overline{) 7176}$

16. $45 \overline{) 5175}$

17. $29 \overline{) 6467}$

18. $42 \overline{) 6426}$

Forest Technician

A new forest!

2835 pine seedlings.

Marco tied them in bundles of 7.

How many bundles altogether?

Write:

$$\begin{array}{r} 405 \\ 7 \overline{) 2835} \\ \underline{28} \\ 03 \\ \underline{00} \\ 35 \\ \underline{35} \\ 0 \end{array}$$

Think:

..... $7 \overline{) 28}$ is 4.

..... $7 \overline{) 03}$?

(Try 0.)

..... $7 \overline{) 35}$ is 5.



Marco tied 405 bundles altogether.

Exercises

Complete.

1. $\begin{array}{r} 70 \blacksquare \\ 6 \overline{) 4218} \\ \underline{42} \\ 01 \\ \underline{00} \\ \blacksquare \blacksquare \\ \blacksquare \blacksquare \\ \hline \blacksquare \end{array}$

2. $\begin{array}{r} 5 \blacksquare \blacksquare \\ 5 \overline{) 2545} \\ \underline{25} \\ \blacksquare \blacksquare \\ \blacksquare \blacksquare \\ \hline \blacksquare \blacksquare \\ \blacksquare \blacksquare \\ \hline \blacksquare \end{array}$

3. $\begin{array}{r} \blacksquare \blacksquare \blacksquare \\ 9 \overline{) 2754} \\ \underline{27} \\ \blacksquare \blacksquare \\ \blacksquare \blacksquare \\ \hline \blacksquare \blacksquare \\ \blacksquare \blacksquare \\ \hline \blacksquare \end{array}$

Divide.

4. $7 \overline{) 1435}$

5. $3 \overline{) 1827}$

6. $4 \overline{) 2812}$

7. $8 \overline{) 2440}$

8. $5 \overline{) 1535}$

9. $6 \overline{) 4818}$

10. $8 \overline{) 7224}$

11. $9 \overline{) 3645}$

12. $3 \overline{) 2118}$

13. $7 \overline{) 5621}$

14. $4 \overline{) 1636}$

15. $6 \overline{) 1848}$

Solve.

16. 1035 spruce seedlings.
5 in each bundle.

How many bundles altogether?

17. 1624 cedar seedlings.
8 in each bundle.

How many bundles altogether?

Roofing Tiles

Weekend job.

3675 glazed roofing tiles.

Max put them in piles of 35.

How many piles altogether?

Write:

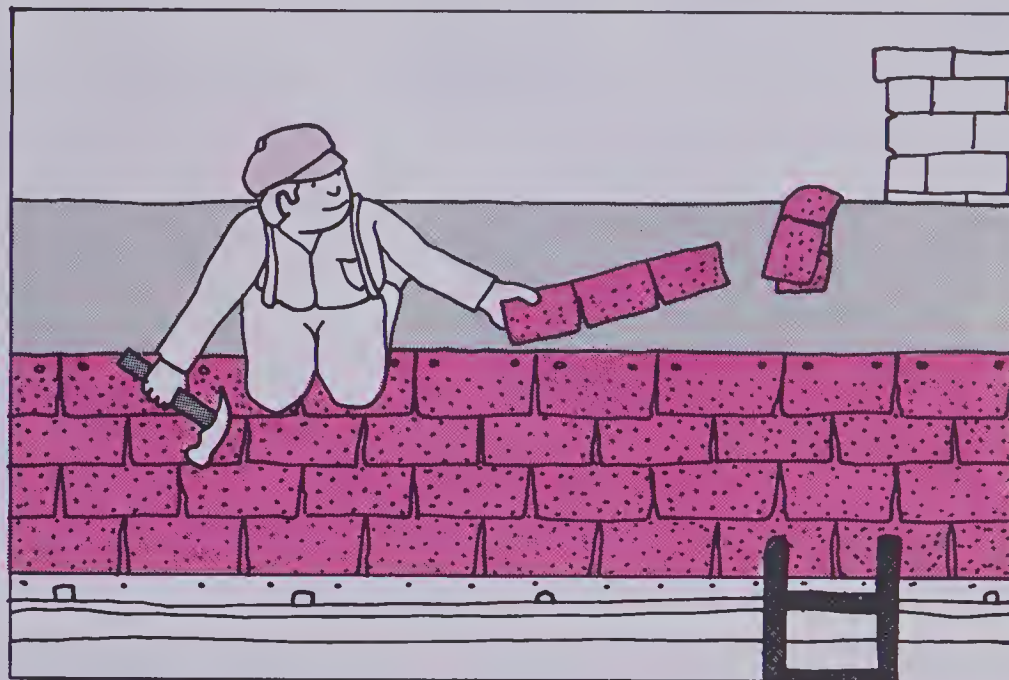
$$\begin{array}{r}
 105 \\
 35 \overline{) 3675} \\
 \underline{35} \\
 17 \\
 \underline{00} \\
 175 \\
 \underline{175} \\
 0
 \end{array}$$

Think:

.... 3 $\overline{) 3}$ is 1.

.... 3 $\overline{) 1}$?
(Try 0.)

.... 3 $\overline{) 17}$ is 5.



Max made 105 piles altogether.

Exercises

Complete.

1.
$$\begin{array}{r}
 20 \blacksquare \\
 43 \overline{) 8858} \\
 \underline{86} \\
 25 \\
 \underline{00} \\
 \blacksquare \blacksquare \blacksquare \\
 \blacksquare \blacksquare \blacksquare \\
 \hline
 \blacksquare
 \end{array}$$

2.
$$\begin{array}{r}
 3 \blacksquare \blacksquare \\
 21 \overline{) 6447} \\
 \underline{63} \\
 \blacksquare \blacksquare \\
 \blacksquare \blacksquare \\
 \hline
 \blacksquare \blacksquare \blacksquare \\
 \blacksquare \blacksquare \blacksquare \\
 \hline
 \blacksquare
 \end{array}$$

3.
$$\begin{array}{r}
 \blacksquare \blacksquare \blacksquare \\
 25 \overline{) 2725} \\
 \underline{25} \\
 \blacksquare \blacksquare \\
 \blacksquare \blacksquare \\
 \hline
 \blacksquare \blacksquare \blacksquare \\
 \blacksquare \blacksquare \blacksquare \\
 \hline
 \blacksquare
 \end{array}$$

Divide. Some estimates will need adjustments, others will not.

4.
$$34 \overline{) 6902}$$

5.
$$28 \overline{) 2996}$$

6.
$$31 \overline{) 3317}$$

7.
$$37 \overline{) 3922}$$

8.
$$41 \overline{) 4469}$$

9.
$$27 \overline{) 2808}$$

10.
$$26 \overline{) 5408}$$

11.
$$36 \overline{) 3852}$$

12.
$$21 \overline{) 8463}$$

13.
$$64 \overline{) 6720}$$

14.
$$35 \overline{) 7210}$$

15.
$$52 \overline{) 5408}$$

Solve.

16. 7650 roofing tiles .

25 in each pile.

How many piles altogether?

17. 9315 roofing tiles.

45 in each pile.

How many piles altogether?

The Checking Stones

Professor R. K. Ology has discovered two stone tablets.

$$\begin{array}{r} 38 \\ 7 \overline{) 266} \\ \underline{21} \\ 56 \\ \underline{56} \\ 0 \end{array}$$

DIVISION

$$\begin{array}{r} 38 \\ \times 7 \\ \hline 266 \end{array}$$

MULTIPLICATION



We can use multiplication to check division.

If the product equals the dividend, the division is correct.

Exercises

Tell which division questions have been done correctly.

1. $\begin{array}{r} 23 \\ 6 \overline{) 138} \\ \underline{12} \\ 18 \\ \underline{18} \\ 0 \end{array}$ Check: $\begin{array}{r} 23 \\ \times 6 \\ \hline 138 \end{array}$

2. $\begin{array}{r} 36 \\ 8 \overline{) 272} \\ \underline{24} \\ 32 \\ \underline{32} \\ 0 \end{array}$ Check: $\begin{array}{r} 36 \\ \times 8 \\ \hline 288 \end{array}$

3. $\begin{array}{r} 27 \\ 33 \overline{) 891} \\ \underline{66} \\ 231 \\ \underline{231} \\ 0 \end{array}$ Check: $\begin{array}{r} 27 \\ \times 33 \\ \hline 81 \\ 81 \\ \hline 891 \end{array}$

Complete each division question. Check by multiplication.

4. $\begin{array}{r} 25 \\ 7 \overline{) 175} \\ \underline{14} \\ 35 \\ \underline{35} \\ 0 \end{array}$ Check: $\begin{array}{r} 25 \\ \times 7 \\ \hline \end{array}$

5. $\begin{array}{r} 1\blacksquare \\ 24 \overline{) 432} \\ \underline{24} \\ \blacksquare\blacksquare\blacksquare \\ \underline{\blacksquare\blacksquare\blacksquare} \\ \blacksquare \end{array}$ Check: $\begin{array}{r} 1\blacksquare \\ \times 24 \\ \hline \end{array}$

6. $\begin{array}{r} 8 \overline{) 288} \\ \underline{} \\ \blacksquare\blacksquare\blacksquare \\ \underline{\blacksquare\blacksquare\blacksquare} \\ \blacksquare \end{array}$

8. $\begin{array}{r} 6 \overline{) 204} \\ \underline{} \\ \blacksquare\blacksquare\blacksquare \\ \underline{\blacksquare\blacksquare\blacksquare} \\ \blacksquare \end{array}$

10. $\begin{array}{r} 24 \overline{) 840} \\ \underline{} \\ \blacksquare\blacksquare\blacksquare \\ \underline{\blacksquare\blacksquare\blacksquare} \\ \blacksquare \end{array}$

12. $\begin{array}{r} 21 \overline{) 987} \\ \underline{} \\ \blacksquare\blacksquare\blacksquare \\ \underline{\blacksquare\blacksquare\blacksquare} \\ \blacksquare \end{array}$

14. $\begin{array}{r} 26 \overline{) 5590} \\ \underline{} \\ \blacksquare\blacksquare\blacksquare\blacksquare \\ \underline{\blacksquare\blacksquare\blacksquare\blacksquare} \\ \blacksquare \end{array}$

7. $\begin{array}{r} 5 \overline{) 265} \\ \underline{} \\ \blacksquare\blacksquare\blacksquare \\ \underline{\blacksquare\blacksquare\blacksquare} \\ \blacksquare \end{array}$

9. $\begin{array}{r} 9 \overline{) 558} \\ \underline{} \\ \blacksquare\blacksquare\blacksquare \\ \underline{\blacksquare\blacksquare\blacksquare} \\ \blacksquare \end{array}$

11. $\begin{array}{r} 36 \overline{) 1620} \\ \underline{} \\ \blacksquare\blacksquare\blacksquare\blacksquare \\ \underline{\blacksquare\blacksquare\blacksquare\blacksquare} \\ \blacksquare \end{array}$

13. $\begin{array}{r} 42 \overline{) 1512} \\ \underline{} \\ \blacksquare\blacksquare\blacksquare\blacksquare \\ \underline{\blacksquare\blacksquare\blacksquare\blacksquare} \\ \blacksquare \end{array}$

15. $\begin{array}{r} 31 \overline{) 4402} \\ \underline{} \\ \blacksquare\blacksquare\blacksquare\blacksquare \\ \underline{\blacksquare\blacksquare\blacksquare\blacksquare} \\ \blacksquare \end{array}$

TV Towers

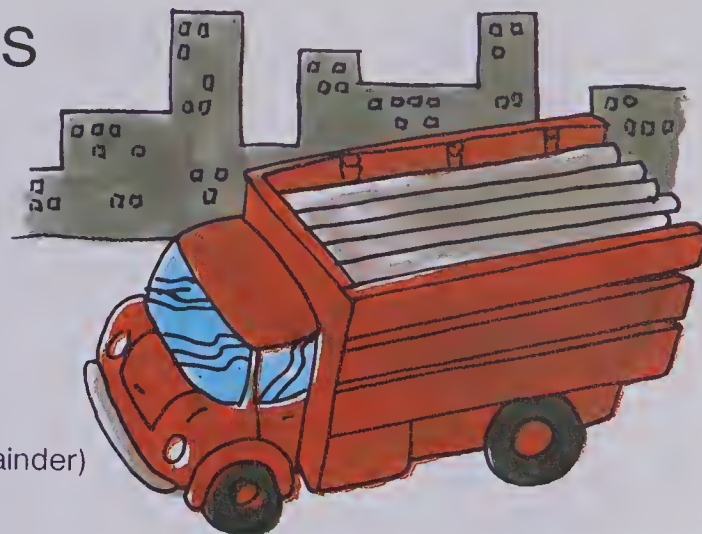
The Weber Construction Company is building a TV relay tower.

A truck delivered 275 pieces of steel.
8 pieces are used for each section.
How many sections can be built?
How many pieces will be left over?

34 sections.

3 pieces left over.

$$\begin{array}{r} 34 \text{ R } 3 \\ 8 \overline{) 275} \\ \underline{24} \\ 35 \\ \underline{32} \\ 3 \text{ (Remainder)} \end{array}$$



Exercises

Complete.

1.
$$\begin{array}{r} 2 \blacksquare \text{ R } \blacksquare \\ 7 \overline{) 185} \\ \underline{14} \\ 45 \\ \underline{\blacksquare \blacksquare} \\ \blacksquare \end{array}$$

2.
$$\begin{array}{r} \blacksquare \blacksquare \text{ R } \blacksquare \\ 6 \overline{) 283} \\ \underline{24} \\ \blacksquare \blacksquare \\ \underline{\blacksquare \blacksquare} \\ \blacksquare \end{array}$$

3.
$$\begin{array}{r} 3 \blacksquare \text{ R } \blacksquare \blacksquare \\ 29 \overline{) 998} \\ \underline{\blacksquare \blacksquare} \\ \blacksquare \blacksquare \blacksquare \\ \underline{\blacksquare \blacksquare \blacksquare} \\ \blacksquare \blacksquare \end{array}$$

Divide. Find (a) the number of tower sections. (Quotients)
(b) the number of pieces left over. (Remainders)

4. $5 \overline{) 456}$

5. $7 \overline{) 320}$

6. $6 \overline{) 507}$

7. $4 \overline{) 331}$

8. $6 \overline{) 794}$

9. $8 \overline{) 2515}$

10. $4 \overline{) 859}$

11. $3 \overline{) 1387}$

12. $21 \overline{) 152}$

13. $32 \overline{) 285}$

14. $26 \overline{) 138}$

15. $45 \overline{) 375}$

16. $24 \overline{) 893}$

17. $41 \overline{) 1449}$

18. $32 \overline{) 770}$

19. $25 \overline{) 1580}$

20. $35 \overline{) 7479}$

21. $22 \overline{) 7292}$

22. $37 \overline{) 5670}$

23. $26 \overline{) 3600}$

24. $21 \overline{) 8509}$

25. $32 \overline{) 3341}$

26. $27 \overline{) 8270}$

27. $43 \overline{) 4582}$



Checking With Remainders

Division with remainders can be checked too!!

$$\begin{array}{r}
 26 \text{ R } 3 \\
 7 \overline{) 185} \\
 \underline{14} \\
 45 \\
 \underline{42} \\
 3
 \end{array}$$

Investigate these two stone tablets.

$$\begin{array}{r}
 26 \\
 \times 7 \\
 \hline
 182 \text{ (Product)} \\
 + 3 \text{ Add the remainder.} \\
 \hline
 185
 \end{array}$$

Exercises

Complete each division. Check by multiplication.

1. $7 \overline{) 299}$ 42 R ■

$$\begin{array}{r}
 28 \\
 \hline
 19 \\
 \hline
 \square \\
 \hline
 \square
 \end{array}$$

Check:

$$\begin{array}{r}
 42 \\
 \times 7 \\
 \hline
 \square \square \square \\
 + \square \text{ R} \\
 \hline
 \square \square \square
 \end{array}$$

2. $4 \overline{) 113}$ 2 ■ R ■

$$\begin{array}{r}
 \square \\
 \hline
 \square \square \\
 \hline
 \square \square \\
 \hline
 \square
 \end{array}$$

Check:

$$\begin{array}{r}
 2 \square \\
 \times 4 \\
 \hline
 \square \square \square \\
 + \square \text{ R} \\
 \hline
 \square \square \square
 \end{array}$$

3. $25 \overline{) 812}$ ■ ■ R ■ ■

$$\begin{array}{r}
 \square \square \\
 \hline
 \square \square \\
 \hline
 \square \square \\
 \hline
 \square \square
 \end{array}$$

Check:

$$\begin{array}{r}
 \square \square \\
 \times \square \square \\
 \hline
 \square \square \square \\
 \hline
 \square \square \\
 \hline
 \square \square \square \\
 + \square \square \text{ R} \\
 \hline
 \square \square \square
 \end{array}$$

Divide. Check by multiplication.

4. $4 \overline{) 225}$

5. $6 \overline{) 507}$

6. $7 \overline{) 254}$

7. $5 \overline{) 241}$

8. $6 \overline{) 920}$

9. $4 \overline{) 1226}$

10. $8 \overline{) 995}$

11. $5 \overline{) 527}$

12. $35 \overline{) 639}$

13. $41 \overline{) 1163}$

14. $27 \overline{) 650}$

15. $32 \overline{) 2347}$

16. $22 \overline{) 3809}$

17. $42 \overline{) 4420}$

18. $29 \overline{) 6795}$

19. $31 \overline{) 6391}$

Divide and check. Some have remainders, others do not.

20. $5 \overline{) 367}$

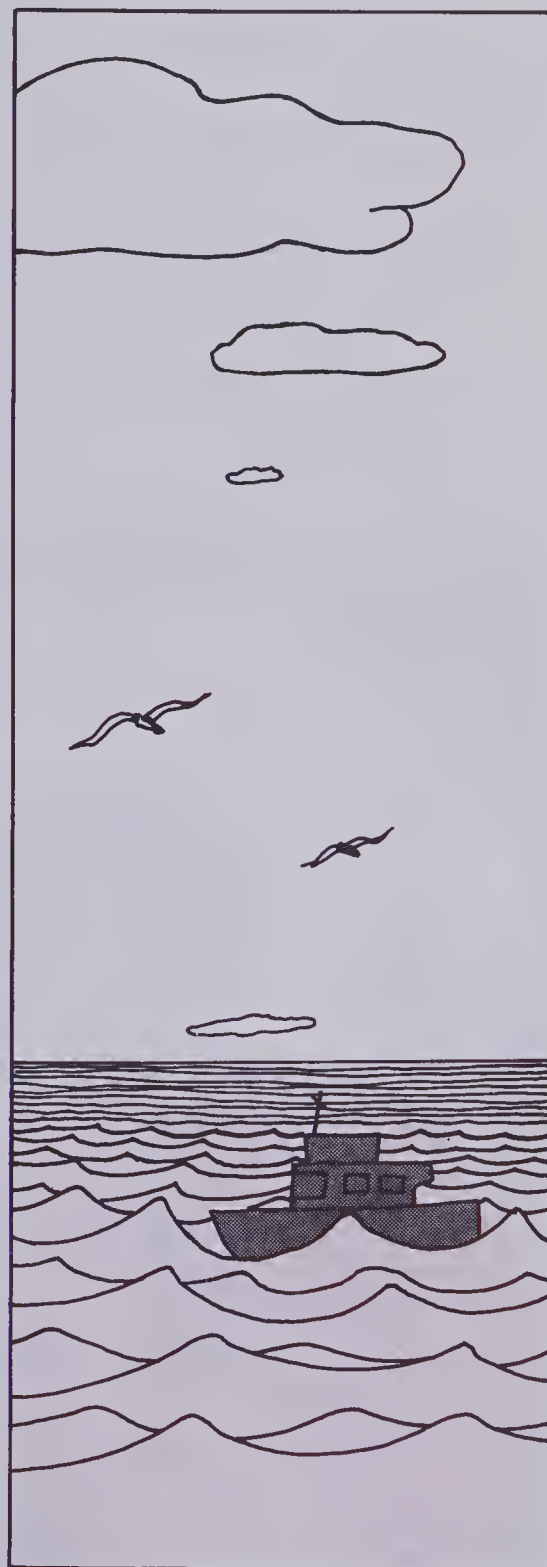
21. $14 \overline{) 882}$

22. $47 \overline{) 2483}$

23. $8 \overline{) 264}$

Physicists

1. Mr. Wong needs 360 samples of steel for an experiment.
There are 16 pieces in a carton.
How many full cartons are needed?
How many extra pieces are needed?
2. Ms. Keer designs a structure requiring 3356 fasteners.
The fasteners are available only in packages of 24.
How many packages are required?
3. In a test to determine how well a particular component wears, the part was vibrated 2500 times in 40 s.
How many vibrations per second was this?
4. A structure is made of 328 identical components each with a mass of 32 kg.
What was the total mass of the structure?
5. Mr. Kerbie heated an engine component to 235°C .
He then cooled it to 85°C .
How many degrees did the temperature drop?
6. A wave in water travels at 1500 cm in 1 min.
How far does it travel in 8 min?
7. Light travels about 1 800 000 000 km in 1 min.
How far would it travel in 1 s?



Motocross!

Equipment:

- * A spinner with the numbers 2 to 9
or
- * eight playing cards with the numbers 2 to 9, one on each card.
- * Two to four coloured markers, one for each player.
- * Scratch pad and pencil.

MINI-MOUNTAIN

31

43

13

67

DREADFUL
DIP

SPINOUT!
Go back
one space

29

47

59

41

CRAZY CORNER

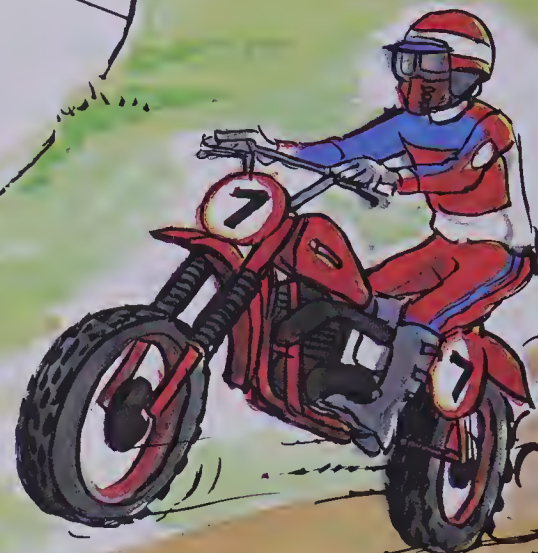
BIG ROCKS
Bend a wheel.
Go back
3 spaces.

17

23

67

STRAIGHT



START/FINISH

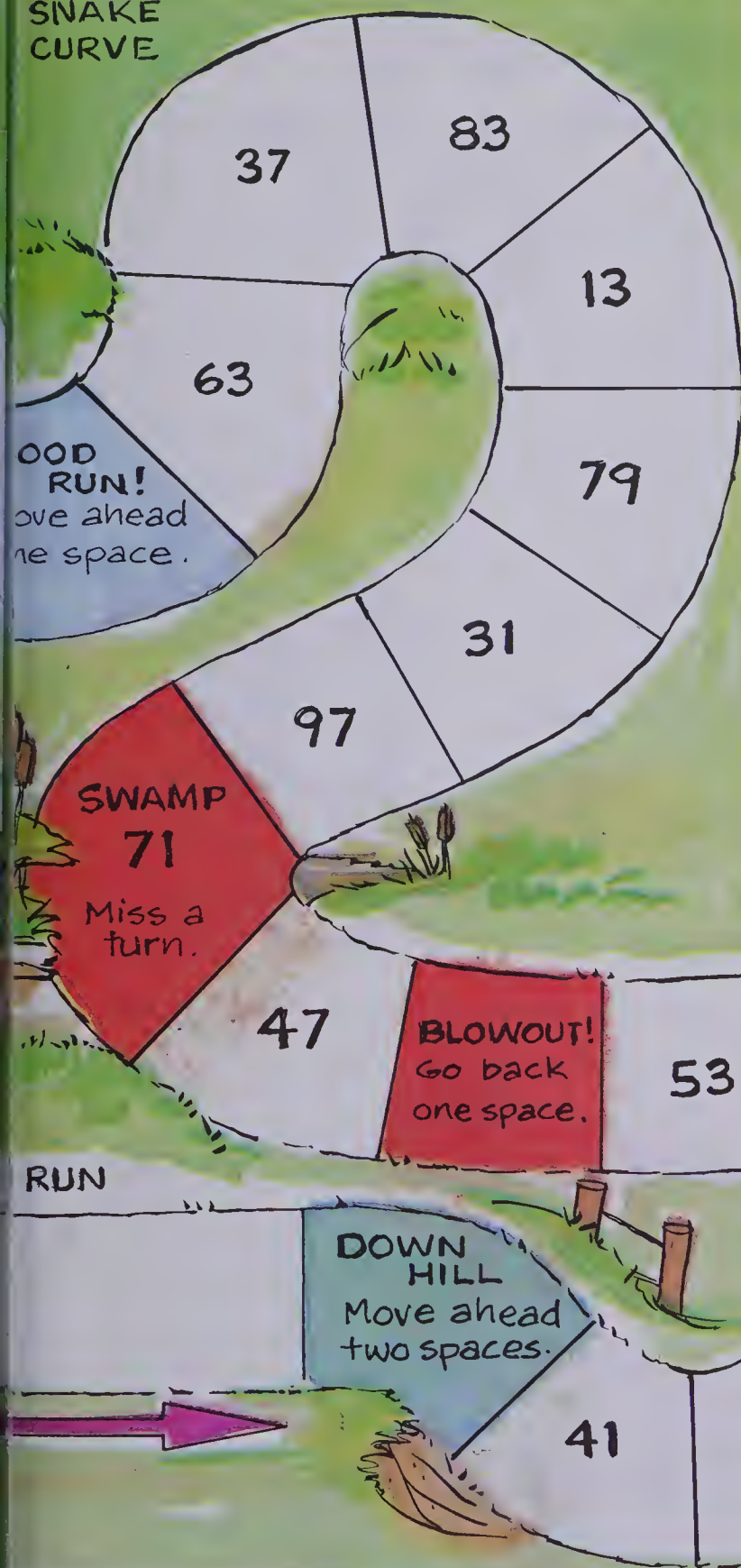
17

59

11

83

SNAKE CURVE

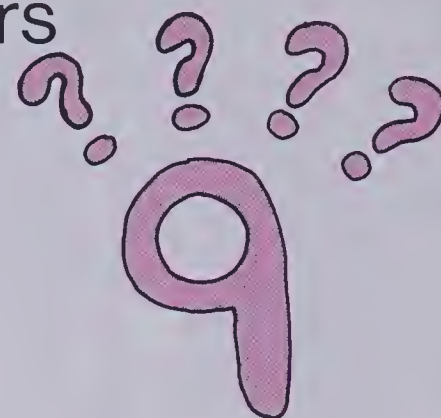


Play:

1. All players place their markers in the starting gate 17 .
2. First player spins spinner or chooses a card.
3. Player uses that number as the divisor for the number on which he/she is sitting. The *remainder* indicates how many spaces a player may move.
 E.g., Kim spins 6.

$$\begin{array}{r} 2 \text{ R}5 \\ 6 \overline{)17} \end{array}$$
 Kim moves ahead 5 spaces (to space 67).
4. Play continues for other players in turn.
5. First player to cross finish line wins!

Division Dazzlers



MYSTERIOUS 9

1. Select any digits whose sum is 9. $1 + 5 + 2 + 1$
2. Write them in any order. 2511
3. Divide by 9.
4. Try other digits. What did you notice?

MAGIC REMAINDERS

1. Select any *prime* number greater than 3.
5, 7, 11, 13, 17, 19, 23, 29,
2. Multiply the number by itself. $5 \times 5 = 25$
3. Add 17. $25 + 17 = 42$
4. Divide by 12.
$$\begin{array}{r} 3 \text{ R } 6 \\ 12 \overline{)42} \end{array}$$
5. Try these steps with other prime numbers in the list.
What do you notice about the remainders?



DIVISION DELIGHTS

1. Select any 3-digit number. 245.
2. Repeat it. 245 245.
3. Divide by 7. $245\ 245 \div 7 = 35\ 035.$
4. Divide result by 11. $35\ 035 \div 11 = 3185.$
5. Divide result by 13. $3185 \div 13 = \blacksquare.$
6. What do you notice about the final answer?
Try these steps with other 3-digit numbers.



Division Track and Field Events

Enter the division events. Watch for remainders!

High Jump

1. (a) $5 \overline{)45}$ (b) $7 \overline{)28}$ (c) $7 \overline{)129}$ (d) $3 \overline{)81}$

60 m Dash

2. (a) $6 \overline{)744}$ (b) $8 \overline{)1883}$ (c) $9 \overline{)1926}$ (d) $4 \overline{)1345}$

100 m Hurdles

3. (a) $7 \overline{)756}$ (b) $4 \overline{)824}$ (c) $6 \overline{)1828}$ (d) $9 \overline{)1845}$

Long Jump

4. (a) $23 \overline{)161}$ (b) $42 \overline{)351}$ (c) $35 \overline{)175}$ (d) $56 \overline{)374}$

100 m Sprint

5. (a) $18 \overline{)491}$ (b) $31 \overline{)1333}$ (c) $26 \overline{)837}$ (d) $37 \overline{)925}$

800 m Run

6. (a) $24 \overline{)3264}$ (b) $43 \overline{)9249}$ (c) $38 \overline{)6156}$ (d) $54 \overline{)9412}$

Relay Race

7. (a) $33 \overline{)6732}$ (b) $25 \overline{)7529}$ (c) $19 \overline{)7714}$ (d) $47 \overline{)9823}$

Each correct answer is worth 1 point. What is your standing in each event?

	White Ribbon 1 point	Bronze Medal 2 points	Silver Medal 3 points	Gold Medal 4 points
High Jump				
60 m Dash				
100 m Hurdles				
Long Jump				
100 m Sprint				
800 m Run				
Relay Race				

BRAINTICKLER

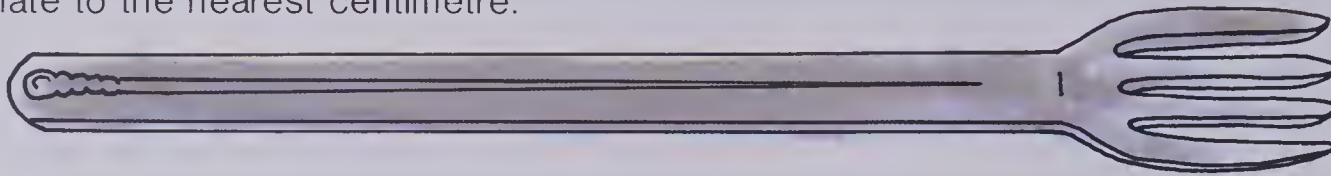
A worm is at the bottom of a 6 m hole. Every hour it crawls up 2 m and then rests 1 h. While resting it slides back 1 m. How long before it reaches the top edge of the hole?



Tune Up

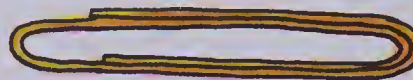
Estimate to the nearest centimetre.

1.



2. The height from the floor to your shoulder when you are standing.

3. Estimate to the nearest millimetre.



Copy and complete.

4. 1 m = ■ dm 5. 1 m = ■ cm 6. 1 m = ■ mm 7. 1 km = ■ m

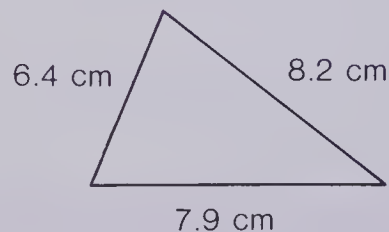
8. 1450 m = ■ km 9. 250 cm = ■ m 10. 340 dm = ■ m 11. 46 mm = ■ cm

Multiply.

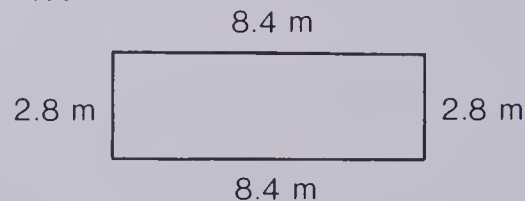
12. 3.1×4.2 13. 32.45×3.7 14. $12 \times 13 \times 6$ 15. $2.3 \times 4.5 \times 6.7$

Calculate the perimeter.

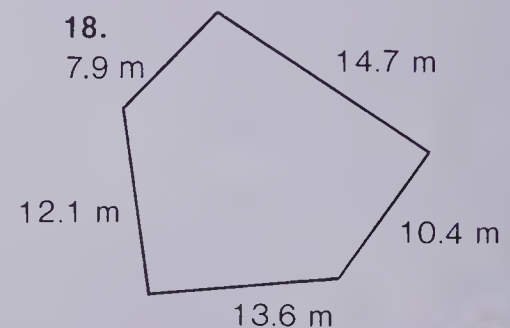
16.



17.



18.



Calculate.

$$\begin{array}{r} 19. \quad 53.46 \\ + 9.58 \\ \hline \end{array}$$

$$\begin{array}{r} 20. \quad 839\,056 \\ + 430\,026 \\ \hline \end{array}$$

$$\begin{array}{r} 21. \quad 79.86 \\ - 3.97 \\ \hline \end{array}$$

$$\begin{array}{r} 22. \quad 560\,031 \\ - 341\,268 \\ \hline \end{array}$$

How did you measure up?

25 - 22 correct

21 - 18 correct

17 - 14 correct

13 or less correct

TOP SHAPE

Practice?

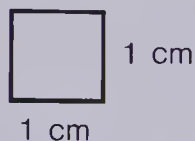
Practice needed.

Practice very important!



Square Centimetre and Square Metre

Actual Size

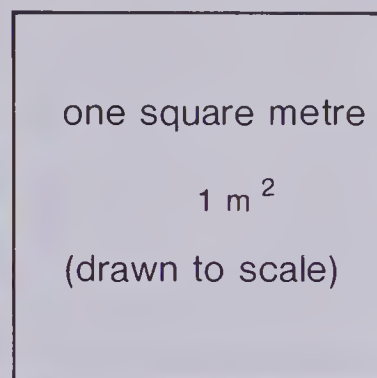


one square centimetre
 1 cm^2



Area is the measure of surface space.

1 m



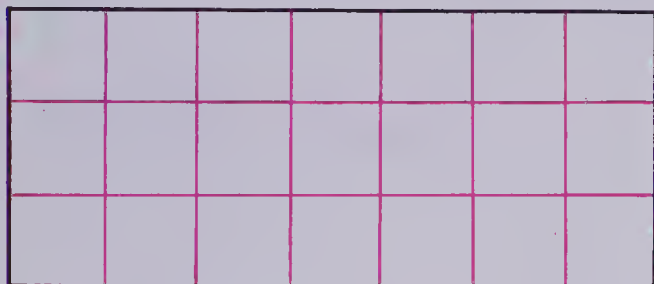
1 m

Scale:
4 cm represents
1 m.

Exercises

What is the area in square centimetres?

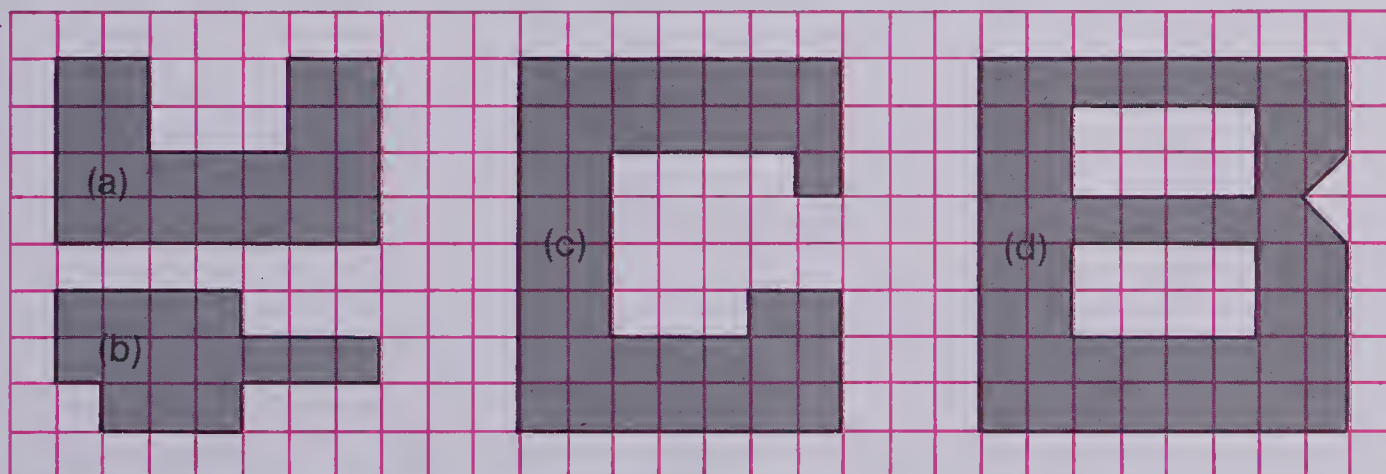
1.



2.

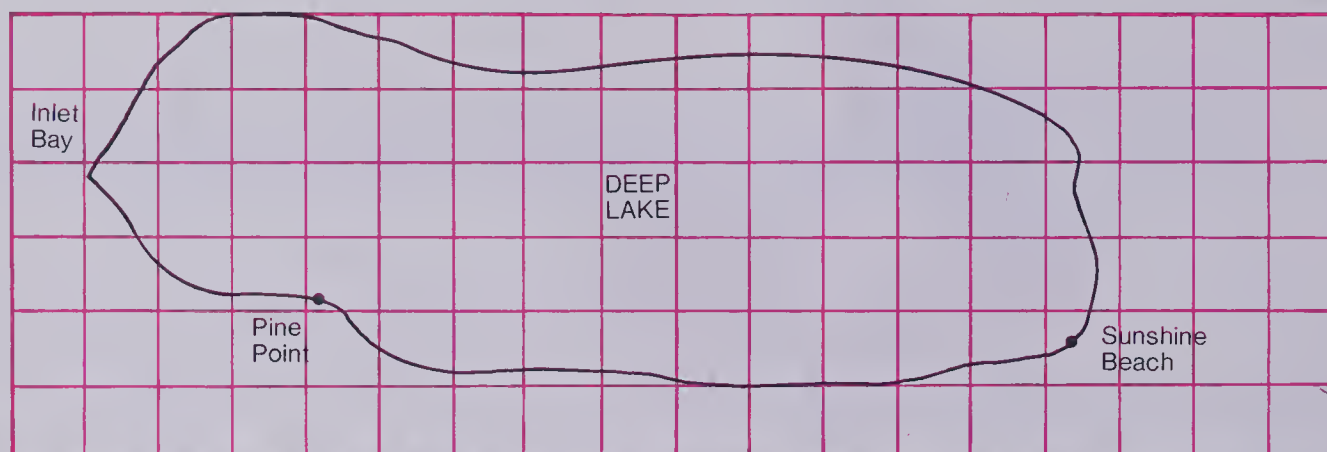


3. Each square represents a square metre. What is the area of each?



4. Make one square metre using newspaper.
How many students can stand on one square metre?

Square Kilometres



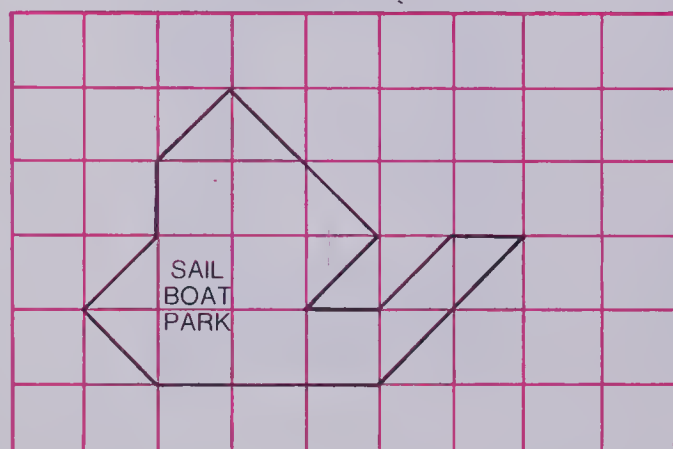
Bill had this map of Deep Lake. Each square represents a square kilometre.

Exercises

1. Count the number of squares totally within the lake.
2. Count the number of squares in or touching the lake.
3. An **approximation** for the area of the lake is between the two answers in Exercises 1 and 2.

What is the approximate area of Deep Lake?

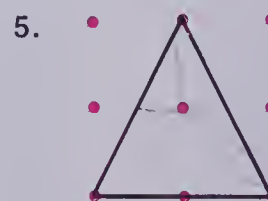
4. Count the squares and half squares to get the area of the park.



Each square stands for one square kilometre.



Find the area in square units.



Area of a Rectangle

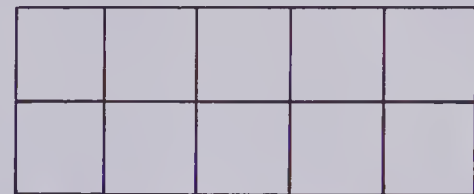
We can find the area of a rectangle in two ways.

Counting

1	2	3	4	5
6	7	8	9	10

Area is 10 square units.

Multiplying



2 units

5 units

5 squares in 1 row.

(5 × 2) squares in 2 rows.

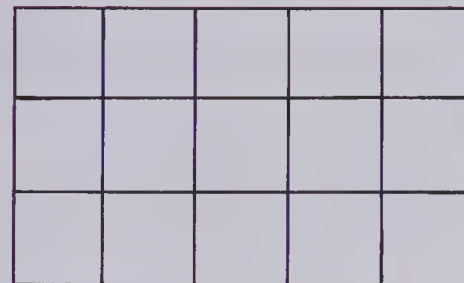
10 square units.

Area of a rectangle = length × width

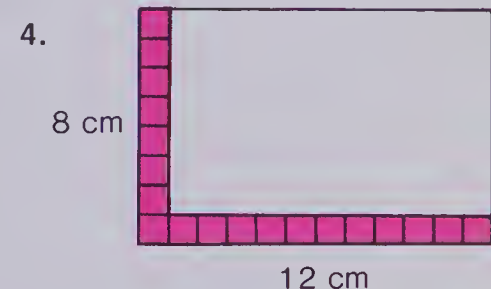
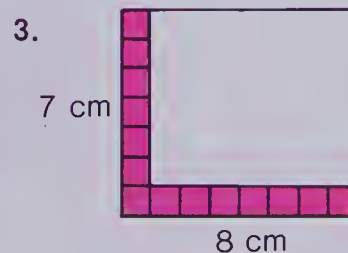
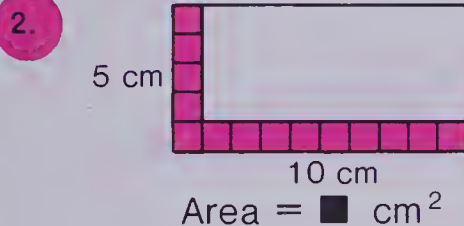
$$A = l \times w$$

Exercises

1. (a) How many squares in 1 row?
- (b) How many rows?
- (c) What is 5×3 ?
- (d) What is the area of the rectangle?

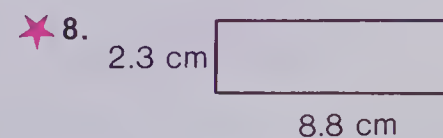
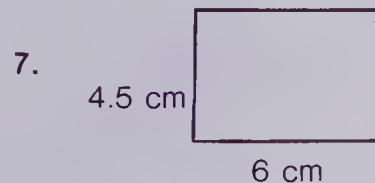
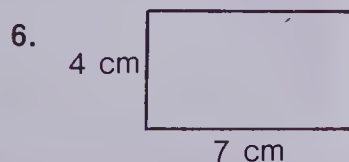


Find the area of each rectangle.



5. In the formula $A = l \times w$, what does each letter represent?

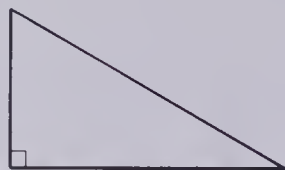
Find the area of each rectangle.



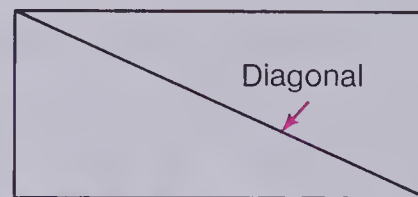
Area of a Right Triangle



Right angle



Right triangle

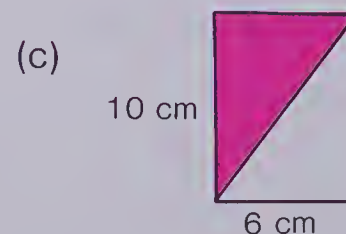
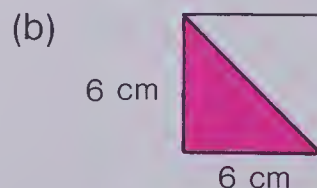
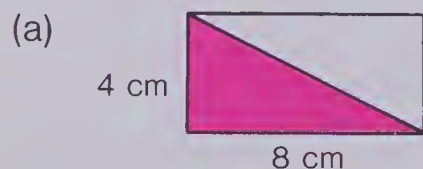
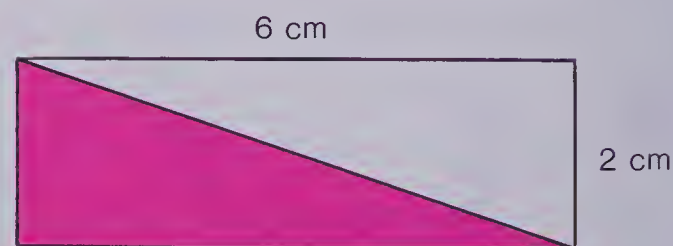
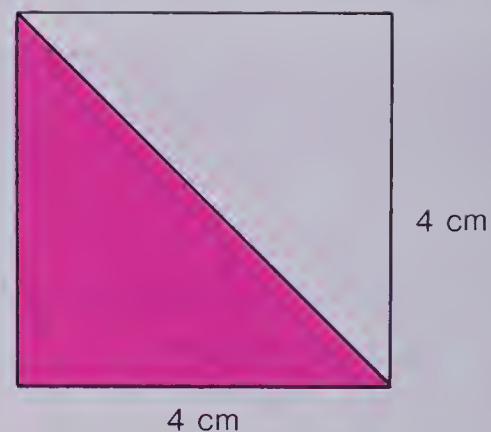


Rectangle

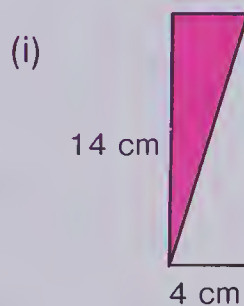
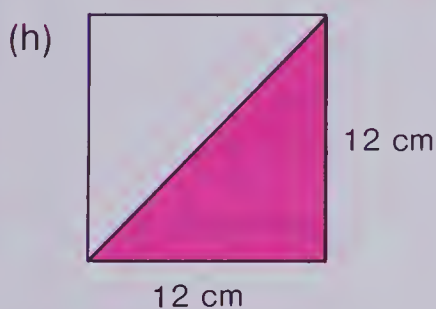
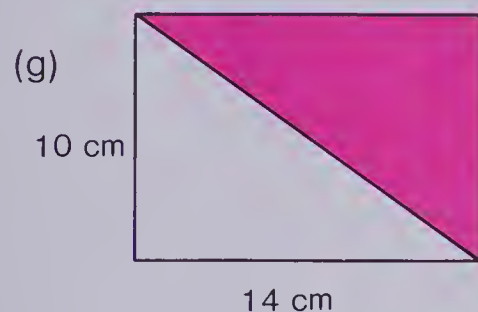
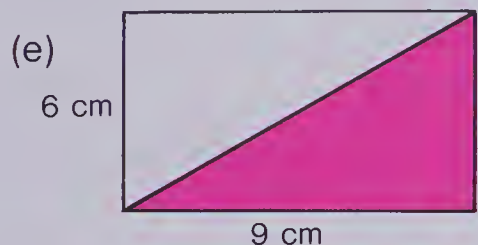
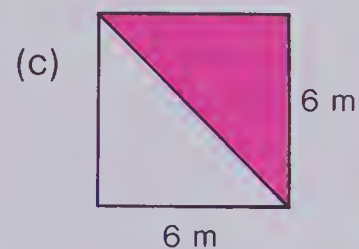
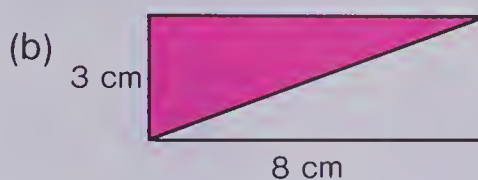
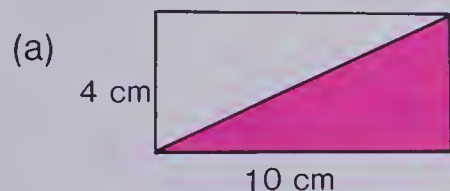
The diagonal produces two right triangles.

Exercises

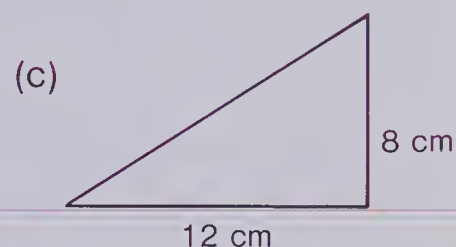
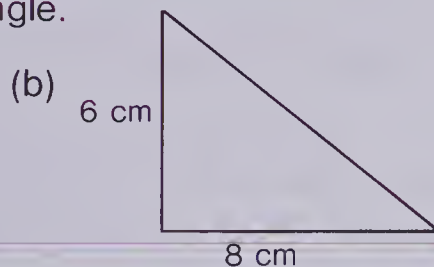
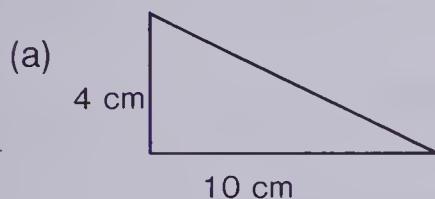
1. (a) What is the area of the square?
 (b) A diagonal is drawn in the square. What new shapes are formed?
 (c) Trace the coloured triangle. Cut it out.
 Is it the same size as the white triangle?
 (d) Is the area of each right triangle half the area of the square?
 (e) What is the area of the right triangle?
2. (a) What is the area of the rectangle?
 (b) Is the area of the coloured triangle the same as the white triangle?
 (c) Is the area of each right triangle half the area of the rectangle?
 (d) What is the area of the coloured right triangle?
3. What is the area of each rectangle?
 What is the area of each coloured triangle?



4. Find the area of each rectangle. Then find the area of each coloured triangle.



★ 5. Find the area of each right triangle.



Tune Up

Multiply.

1. $2 \times 3 \times 4$

2. $3 \times 4 \times 5$

3. $2 \times 4 \times 3$

4. $4 \times 5 \times 6$

5. $3 \times 1 \times 2$

6. $4 \times 5 \times 2$

7. $5 \times 12 \times 16$

8. $8 \times 22 \times 16$

9. $27 \times 13 \times 2$

10. $28 \times 45 \times 12$

11. $27 \times 30 \times 42$

12. $44 \times 45 \times 56$

Redecorating Margo's Room

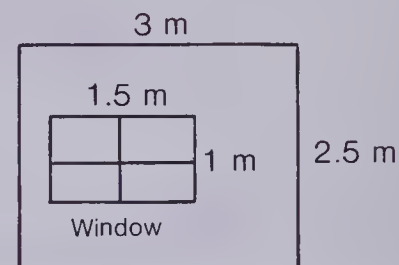
Margo and her dad
redecorated her room.

They wallpapered and painted.



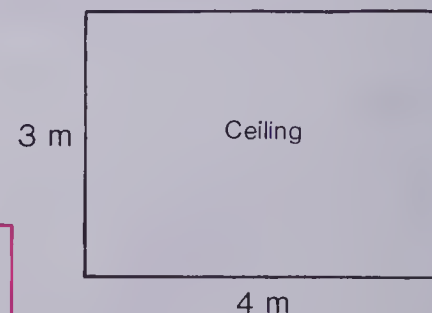
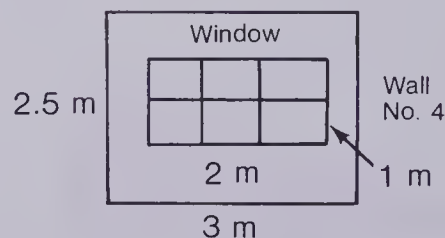
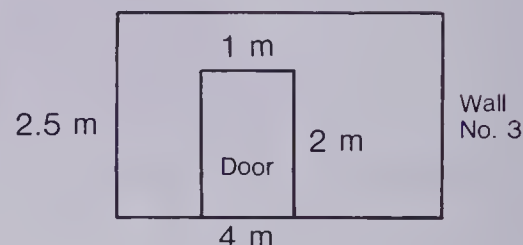
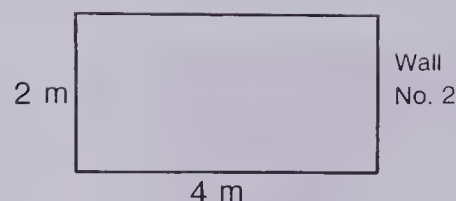
Wall No. 1: Area of wall = 3×2.5
Area of window = 1.5×1
Area to be wallpapered

$$\begin{array}{r} 7.5 \\ -1.5 \\ \hline 6 \text{ m}^2 \end{array}$$



Exercises

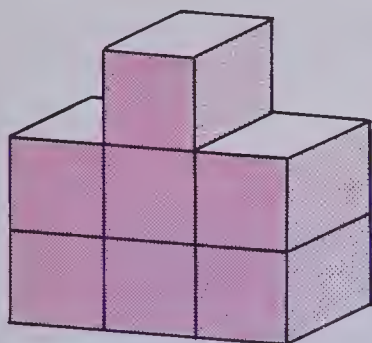
- Wall No. 2 is 2 m high and 4 m long.
How many square metres of wallpaper are needed for this wall?
- Wall No. 3 is to be painted.
How many square metres are to be painted?
- Wall No. 4 is to be wallpapered.
How many square metres of wallpaper are needed?
- What is the total amount of wallpaper needed for Margo's room?
- Wallpaper costs \$1.15 for 1 m².
What is the cost of the wallpaper?
- One square metre of rug costs \$16.95.
How much will a rug cost to cover the floor?
- The ceiling of the room is painted white.
How much white paint is needed?
- What is the cost of the paint for the ceiling?
- ★ What is the cost of painting Wall No. 3?



1 L of paint
covers 12 m².

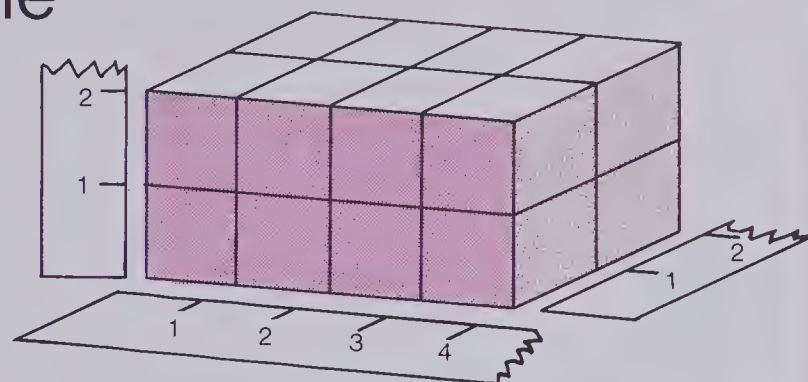
Paint costs
\$4.60 for 1 L.

Volume



Volume: 7 cubic units

Volume is measured
in
cubic units.



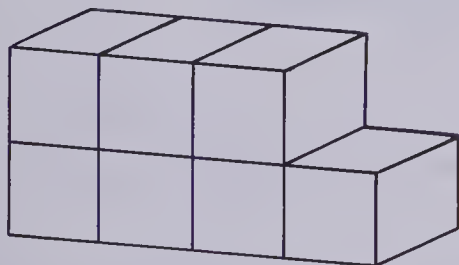
Volume: 16 cubic units

Volume is the measure of the **space** in a container.

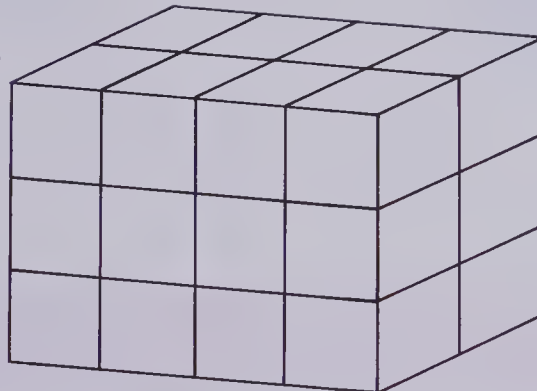
Exercises

Count the cubic units to find the volume.

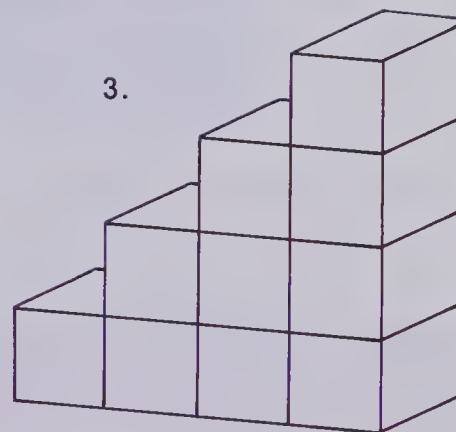
1.



2.



3.



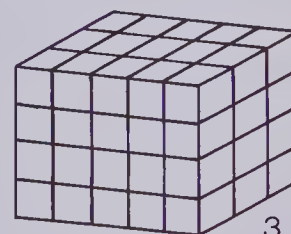
4. Find the number of cubic units in each layer. Then multiply by the number of layers to find the volume.

(a) How many cubes in 1 layer?

Think: 5×3

(b) How many cubes in 4 layers?

Think: $5 \times 3 \times 4$



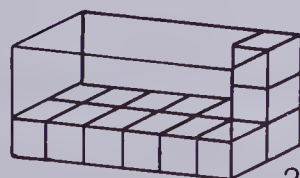
4 units

3 units

5 units

Find the number of cubes to fill each.

5.

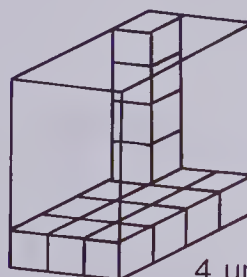


3 units

2 units

6 units

6.

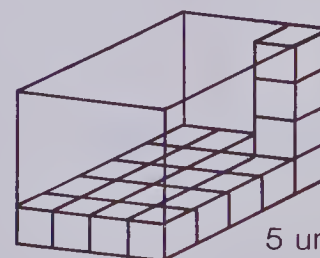


5 units

4 units

3 units

7.



4 units

5 units

4 units

Volume of Rectangular Prisms

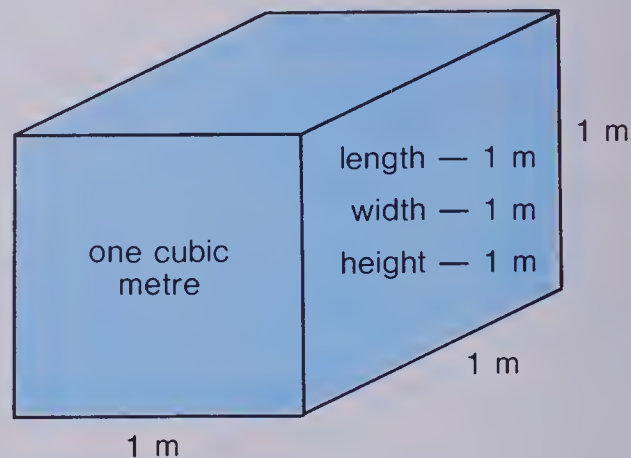
Two common units of volume are:

The cubic centimetre (cm^3)

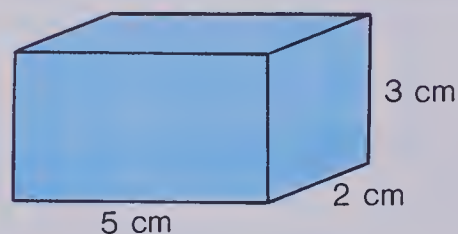


length — 1 cm
width — 1 cm
height — 1 cm

The cubic metre (m^3)



Volume



1 layer of cubic centimetres = 5×2
3 layers of cubic centimetres = $5 \times 2 \times 3$
The volume of this prism is 30 cm^3 .

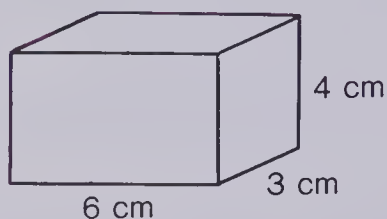
Scale:
3 cm represents
1 m.

The **volume** of a rectangular prism is the product of the length, width, and height.

$$V = l \times w \times h$$

Exercises

1. Find the volume of the rectangular prism.



Think: Number of cubic centimetres in 1 layer.

Write: 6×3

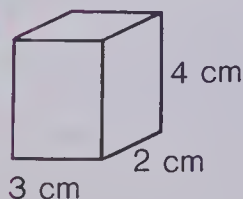
Think: Number of cubic centimetres in 4 layers.

Write: $6 \times 3 \times 4$

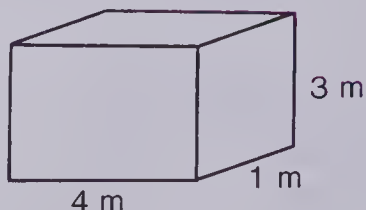
Write: Volume = ■

Find the volume in each rectangular prism.

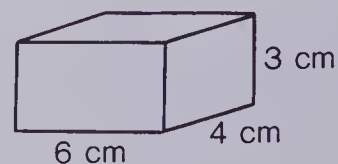
2.

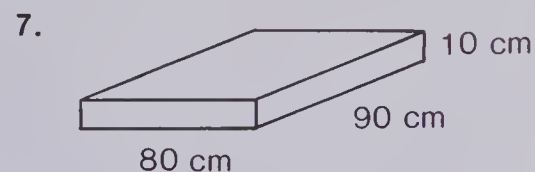
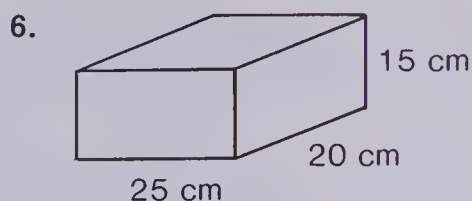
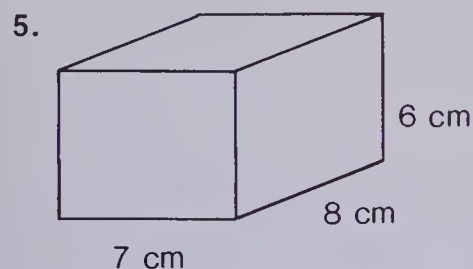


3.



4.



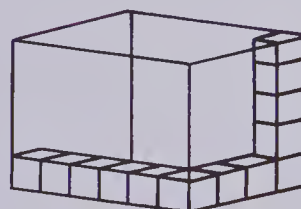


Find the volume of each rectangular prism.

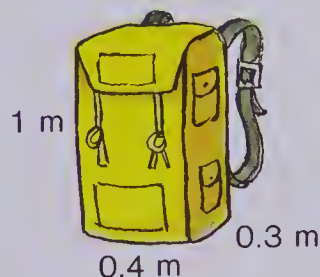
	Length	Width	Height		Length	Width	Height
8.	10 cm	3 cm	6 cm	9.	11 m	5 m	7 m
10.	8 m	6 m	4 m	11.	9 cm	4 cm	3 cm
12.	5 cm	5 cm	10 cm	13.	6 cm	1 cm	10 cm
14.	9 cm	4.5 cm	10 cm	15.	2.2 cm	4 cm	10 cm
★16.	35 cm	15 cm	12 cm	★17.	38 cm	27 cm	19 cm
★18.	4.5 m	2.8 m	1.4 m	★19.	8.5 m	4.7 m	2.3 m

Solve these problems.

20. John put cubes in a box.
He put 6 along the length, 4 along the width, and 5 along the height.
How many cubes can he put in the box altogether?



21. Martin's backpack is
 $0.4 \text{ m} \times 0.3 \text{ m} \times 1 \text{ m}$.
Martin has 0.25 m^3 of gear.
Can he get all his gear in the pack?



22. The box on a small truck is 1.5 m wide, 2 m long, and 1.3 m high.
How many cubic metres does the box hold?

23. A construction foreman orders 10 cm^3 of gravel.
Can a truck with a box $1.4 \text{ m} \times 2.2 \text{ m} \times 3.1 \text{ m}$ deliver it as one load?



Chapter Test

1. Divide. Some have remainders.

(a) $24 \overline{)168}$

(b) $32 \overline{)197}$

(c) $28 \overline{)452}$

(d) $21 \overline{)567}$

(e) $45 \overline{)5895}$

(f) $6 \overline{)1218}$

(g) $7 \overline{)2116}$

(h) $36 \overline{)7425}$

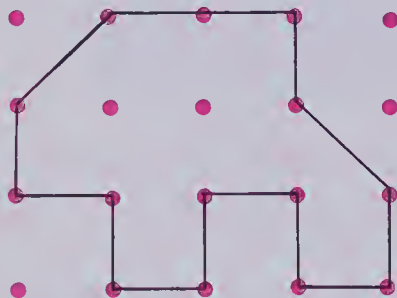
2. Show how you would check these division questions.

(a)
$$\begin{array}{r} 26 \\ 52 \overline{)1352} \end{array}$$

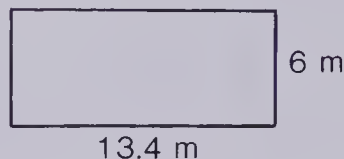
(b)
$$\begin{array}{r} 8 \text{ R } 15 \\ 27 \overline{)231} \end{array}$$

3. What is the area of

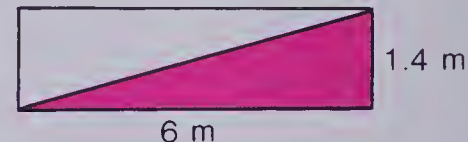
(a) this shape?



(b) this rectangle?

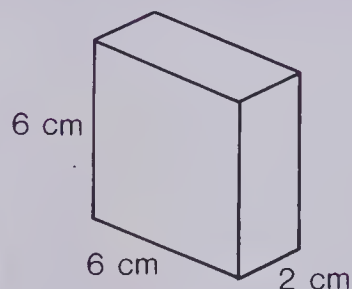


(c) the shaded triangle?

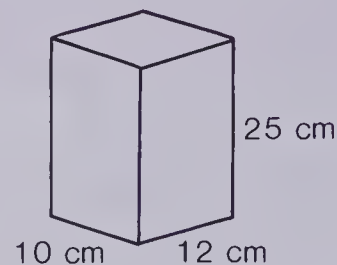


4. What is the volume?

(a)



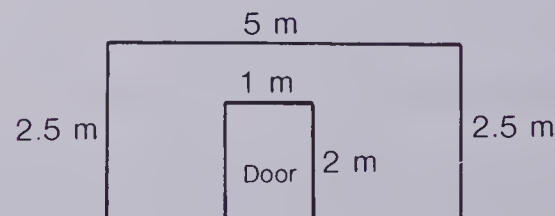
(b)



5. Solve.

(a) This wall is to be wallpapered.
How many square metres of wallpaper are needed?

(b) Brent has 153 maple seedlings.
He packs 24 in each crate.
How many crates can he pack?
How many seedlings left over?



Cumulative Review

1. Add.

$$\begin{array}{r} (a) \quad 314 \\ \quad 80 \\ +258 \\ \hline \end{array}$$

$$\begin{array}{r} (b) \quad 280.72 \\ +364.19 \\ \hline \end{array}$$

2. Subtract.

$$\begin{array}{r} (a) \quad 602 \\ -247 \\ \hline \end{array}$$

$$\begin{array}{r} (b) \quad 425.03 \\ -209.76 \\ \hline \end{array}$$

3. Multiply.

$$\begin{array}{r} (a) \quad 83 \\ \times 24 \\ \hline \end{array}$$

$$\begin{array}{r} (b) \quad 14.9 \\ \times 0.13 \\ \hline \end{array}$$

4. Divide.

$$(a) \quad 6 \overline{)174}$$

$$(b) \quad 23 \overline{)3956}$$

5. Write the value of each underlined digit.

(a) 29 048

(b) 6 521 473

(c) 514.37

6. Round to the nearest hundredth.

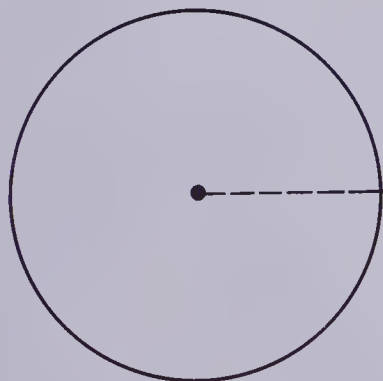
(a) 75.12

(b) 8.059

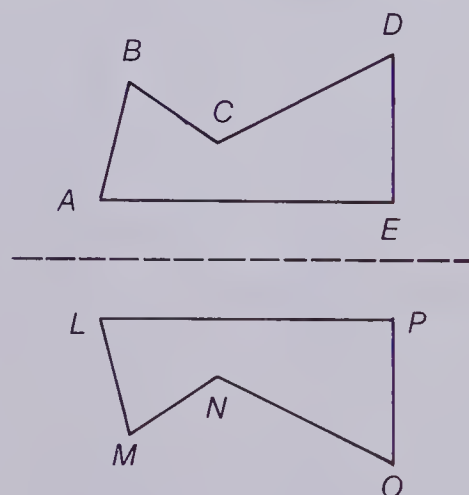
(c) 12.136

7. Use a ruler to find the measure of:

(a) the radius; (b) the diameter.



8. Name the matching vertices of this pair of congruent figures.



9. Choose the best measure.

Paper clip



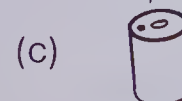
0.1 t 1 g
1 kg 10 L

Distance from A to B



0.5 m 50 dm
5 cm 500 mm

Pop can



284 g 2.84 L
2.84 kg 284 mL

Chapter 6

Graphs and Relations

Number Line

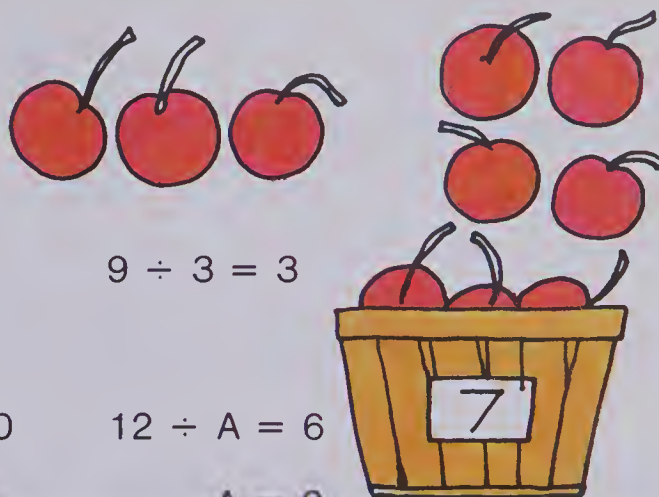
Pictographs, Line and Bar Graphs

Ordered Pairs



Equations

A number sentence with an equals sign (=) is an **equation**.



Equations:

$$3 + 4 = 7$$

$$6 - 4 = 2$$

$$2 \times 4 = 8$$

$$9 \div 3 = 3$$

Solve by finding the missing numbers in these equations.

$$3 + \blacksquare = 9$$

$$6 - \blacktriangle = 1$$

$$2 \times N = 10$$

$$12 \div A = 6$$

Solutions: $\blacksquare = 6$

$$\blacktriangle = 5$$

$$N = 5$$

$$A = 2$$

Exercises

Find and write the missing number.

1. $5 + \blacksquare = 7$

$$5 + \boxed{2} = 7$$

$$\blacksquare = ?$$

What number must be added to 5 to get 7?

The missing number is ?.

3. $7 \times N = 21$

$$7 \times \underline{\quad} = 21$$

$$N = ?$$

What number multiplied by 7 gives 21?

5. $\blacksquare + 7 = 19$

$$\blacksquare = ?$$

What number added to 7 gives 19?

2. $8 \div \blacktriangle = 4$

$$8 \div \boxed{2} = 4$$

$$\blacktriangle = ?$$

What number do I divide into 8 to get 4?

The missing number is ?.

4. $9 - M = 4$

$$9 - \underline{\quad} = 4$$

$$M = ?$$

What number subtracted from 9 gives 4?

6. $N - 6 = 8$

$$N = ?$$

What number can I subtract 6 from to get 8?

Solve.

7. $10 + \blacksquare = 14$

10. $7 - T = 4$

13. $6 \times \blacksquare = 18$

16. $10 \div \blacktriangle = 5$

8. $12 + N = 16$

11. $4 - \blacksquare = 0$

14. $5 \times S = 15$

17. $12 \div \blacktriangle = 2$

9. $9 + \blacktriangle = 10$

12. $8 - M = 6$

15. $3 \times \blacktriangle = 12$

18. $8 \div B = 1$

Inequations

A number sentence with one of these symbols, $>$ or $<$, is an **inequation**.

Inequations:

$$N < 5$$

$$\blacktriangle + 5 < 10$$

$$12 > 7 + \blacksquare$$

To solve an inequation we must find *all* the whole numbers that make true statements.

$$N + 4 < 7$$

Solutions using whole numbers.

$>$ means
"is greater than".
 $<$ means
"is less than".

$$0 + 4 < 7$$

$$1 + 4 < 7$$

$$2 + 4 < 7$$

$N = 0$ is a solution.

$N = 1$ is a solution.

$N = 2$ is a solution.

Think:

Since $3 + 4 = 7$
then $N = 3$ is *not* a solution.

The solutions are 0, 1, 2.

Exercises

Make the sentences true by using $>$, $<$, or $=$.

1. $3 + 2 \bullet 7$

2. $5 \times 3 \bullet 8$

3. $6 - 4 \bullet 1$

4. $26 \div 2 \bullet 13$

5. $8 \times 3 \bullet 25$

6. $36 \div 9 \bullet 4$

7. $17 - 12 \bullet 4$

8. $27 + 4 \bullet 30$

9. $5 \times 4 \bullet 25$

True or false?

10. $8 < 7$

11. $12 - 6 > 7$

12. $16 \div 8 < 3$

13. $3 \times 9 > 25$

14. $33 < 4 \times 9$

15. $54 > 7 \times 6$

16. $12 - 3 > 4 + 5$

17. $15 \div 5 < 2 \times 6$

18. $24 \div 8 > 6 \times 0$

Solve each using whole numbers. List the solutions.

19. $3 + \blacksquare < 5$

20. $4 + N < 7$

21. $2 + 3 > \blacksquare$

22. $5 - \blacksquare < 3$

23. $8 - 4 > M$

24. $17 - 15 > A$

25. $3 \times N < 6$

26. $2 \times 3 > \blacksquare$

27. $\blacktriangle \times 5 < 6$

28. $9 \div 3 < T$

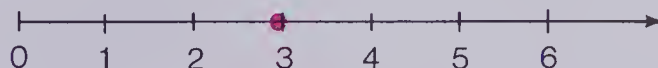
29. $16 \div 4 < B$

30. $12 \div A < 3$

Number Line

We can graph whole numbers on a number line.

Example: Show the graph of $N = 3$.

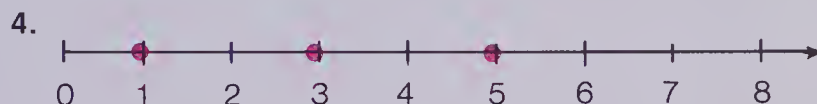
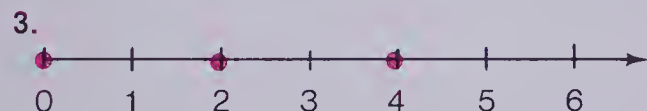
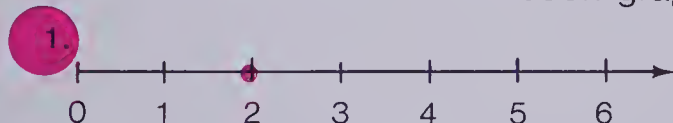


Example: Show the graph of $N = 4, 5, 6$.



Exercises

Which whole numbers have been graphed.



Draw whole number lines and graph these number solutions.

5. $N = 3$

6. $A = 6$

7. $N = 3, 5$

8. $0, 1, 2$

9. $1, 2, 3, 4$

10. $0, 2, 4, 6$

Write the solutions for each.

Then graph the solutions on a whole number line.

11. $N < 3$

12. $T < 5$

13. $4 > R$

14. $X = 6$

15. $\blacksquare < 2$

16. $A = 3$

17. $1 + 5 > \blacksquare$

18. $3 \times N = 12$

19. $2 \times 3 > T$

20. $\blacksquare < 17 - 12$

21. $\blacksquare < 3 \times 1$

★ 22. $N < 9 \times 0$

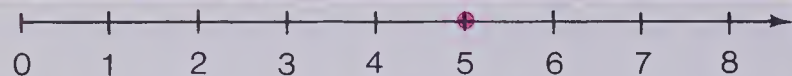
Graphing Solutions

We can graph solutions of

equations.

$$3 \times N = 15$$

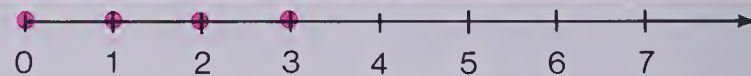
Solution: $N = 5$



inequations.

$$12 - N > 8$$

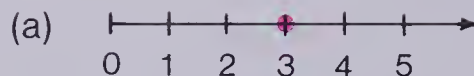
Solution: $N = 0, 1, 2, 3$



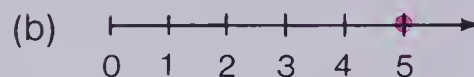
Exercises

Match the solutions with their graphs.

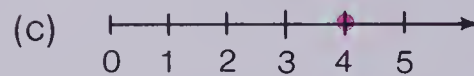
1. $X = 3$



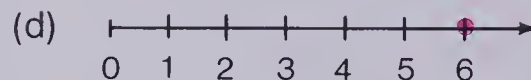
2. $N + 3 = 8$



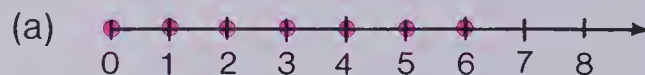
3. $4 \times \blacksquare = 24$



4. $36 \div \blacksquare = 9$



5. $8 > \blacksquare$



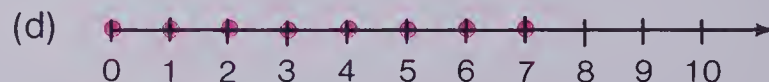
6. $N + 3 < 7$



7. $N < 6 \times 1$



8. $56 \div 8 > T$



9. $A < 8 - 3$



Solve each equation.

Graph the solution on a whole number line.

10. $N + 5 = 8$

11. $T - 9 = 4$

12. $\blacksquare \times 3 = 12$

13. $12 \div 6 = A$

14. $16 - A = 15$

15. $\blacksquare - 6 = 7$

16. $8 \div \blacktriangle = 8$

17. $19 - 15 = N$

18. $5 \times N = 25$

Solve each inequation.

Graph the solutions of each inequation on a whole number line.

19. $N + 4 < 8$

20. $12 > N + 7$

21. $6 \times N < 24$

22. $5 \times G < 20$

23. $40 > 10 \times \blacksquare$

24. $16 - N > 12$

25. $18 - A > 14$

26. $26 - A > 20$

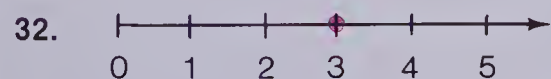
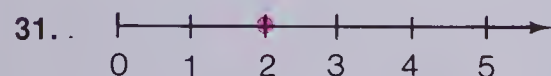
27. $10 < 30 \div N$

28. $3 \times N < 17$

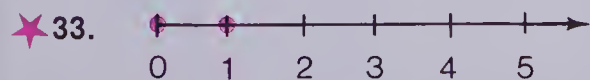
29. $20 < 46 \div N$

30. $33 > 10 \times A$

Write two equations for each.



Write two inequations for each.



BRAINTICKLER

1. Explain why \blacktriangle must be either 5 or 6.

$$\begin{array}{r} \blacksquare 7 \blacksquare \\ + \blacksquare 8 \blacksquare \\ \hline \blacksquare \blacktriangle \blacksquare \end{array}$$

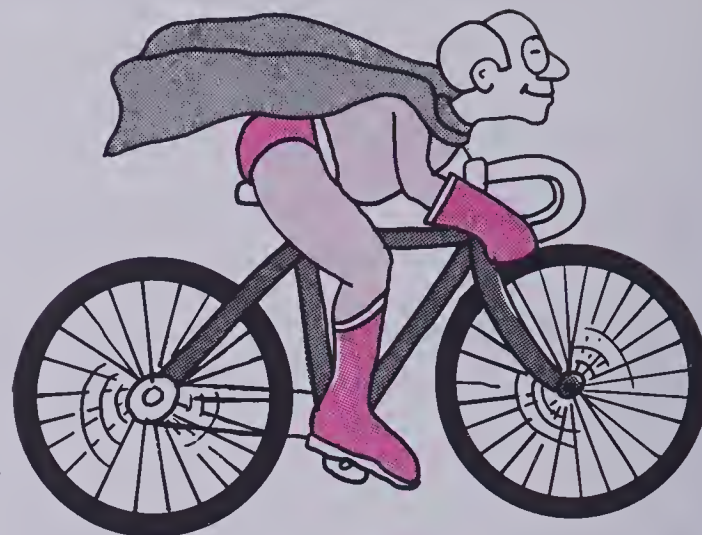
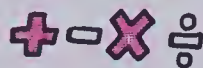
2. Explain why \blacktriangle must be either 7 or 8.

$$\begin{array}{r} \blacksquare 6 \blacksquare \\ - \blacksquare 8 \blacksquare \\ \hline \blacksquare \blacktriangle \blacksquare \end{array}$$

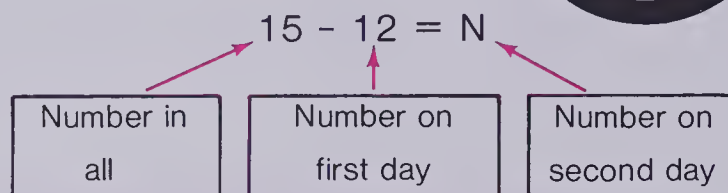
Solving Problems Using Equations

Mr. Herb sold 15 bicycles in two days.
He sold 12 on the first day.
How many did he sell on the second day?

Step 1. Answer Professor Q's four questions.



Step 2. Write a number sentence that fits the problem.



Step 3. Solve.

$$15 - 12 = N$$
$$3 = N$$

Step 4. Write a statement that answers the problem.

He sold 3 bicycles on the second day.

Exercises

1. Mr. Herb served 48 customers in two days.
The first day he served 22 customers.
How many did he serve on the second day?
 - (a) How many customers the first day?
 - (b) How many customers the second day? (Use ■.)
 - (c) How many customers altogether?
 - (d) Write a number sentence that fits the problem.
 - (e) Solve.
 - (f) Write a statement.



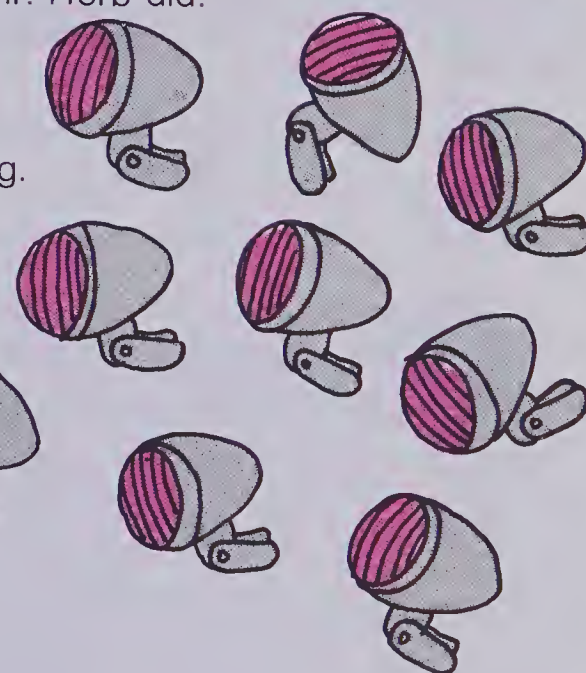
2. Mr. Herb sold 16 bicycle seats in one day.
He sold 8 before lunch.
How many did he sell after lunch?
(a) Write a number sentence that fits the problem.
(b) Solve. (c) Write a statement.



3. Mr. Herb sold 8 bicycle carriers.
Ms. Exner sold 3 fewer than Mr. Herb.
How many did Ms. Exner sell?



4. Ms. Exner sold three times as many bicycle lights than Mr. Herb did.
Mr. Herb sold 9 lights.
How many did Ms. Exner sell?



5. There were 36 sets of pedals on the shelf in the morning.
Mr. Herb and Ms. Exner sold a number of sets.
When the shop closed there were only 16 on the shelf.
How many sets of pedals did they sell?

6. Mr. Herb needs to order 24 chains.
There are 4 chains to a box.
How many boxes should he order?

7. Ms. Exner received an order for 48 kickstands.
She has 16 on the shelf.
How many more does she need?

8. Mr. Herb sells three times as many 10-speed bicycles as 5-speed bicycles.
The number of 5-speed bicycles he sold was 15.
How many 10-speed bicycles did he sell?

- ★ 9. Ms. Exner received an order for 9 Cougar XM bicycles.
She knew she had fewer than 4 Cougar XM bicycles.
What number of Cougar XM bicycles might she have?

- ★ 10. In the morning there were 12 lock chains on the shelf.
Mr. Herb remembers selling 6. More might have been sold.
How many lock chains could be on the shelf?



Using Equations

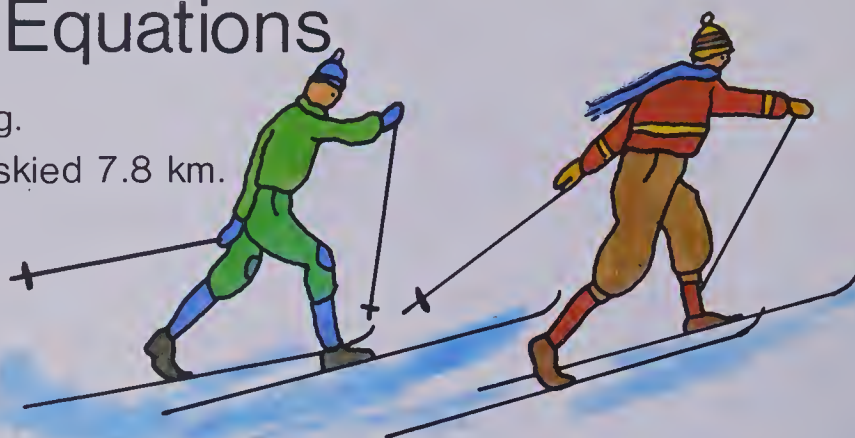
Melvin and Gordon went cross-country skiing.
They skied 6.3 km before lunch. Then they skied 7.8 km.
How far did they ski altogether?

Answer Professor Q's questions.

Write an equation: $6.3 + 7.8 = N$

Solve: $14.1 = N$

Write a statement: They skied 14.1 km altogether.



Exercises

1. Melvin carried a pack with a mass of 5.8 kg.
Gordon's pack was 6.4 kg.
How many kilograms were the two packs together?

Write an equation: $\blacksquare + \blacktriangle = N$

Solve the equation: $\blacktriangledown = N$

Write a statement:

2. Refer to Exercise 1.
How many more kilograms was Gordon's pack than Melvin's?

Write an equation: $\blacksquare - \blacktriangle = N$

Solve the equation: $\blacktriangledown = N$

Write a sentence:

3. Clara carried a pack with a mass of 6.3 kg.
Jenny's pack was 5.5 kg.
How many kilograms were the two packs together?

4. Refer to Exercise 3.
How many more kilograms was Clara's pack than Jenny's?

5. Gordon's skis were 150 cm long.
Melvin's skis are 15 cm longer.
How long are Melvin's skis?



6. Clara's skis were 135 cm long.
Jenny's skis are 35 cm longer.
How long are Jenny's skis?
7. Gary skied 3 times as far as Fred.
Fred skied 3.1 km.
How far did Gary ski?

Write an equation: $\blacksquare \times \blacktriangle = N$

Solve: $\blacktriangledown = N$

Write a statement:



8. Fred skied the Porcupine Trail 4 times in a week.
The trail was 4.6 km long.
How many kilometres did Fred ski in the week?
9. Gary skied the Eagle Trail five times in a week.
The trail was 5.7 km long.
How many kilometres did Gary ski in the week?
10. Irene skied the Moose Mountain Trail in 1.5 h.
Nancy skied the trail in 2.7 h.
How much more time did Nancy take than Irene?
11. Melvin skied the Spray River Trail in 2.8 h.
Gordon skied the trail in 3.3 h.
How much more time did Gordon take than Melvin?
12. Irene, Mary, and Clara share in buying a repair ski tip.
A tip cost \$7.14.
How much is each person's share?

Write an equation: $\blacksquare \div \blacktriangle = N$

Solve: $\blacktriangledown = N$

Write a statement:



- ★13. Irene and Clara decided to break a 13.6 km ski trip into 4 equal parts.
How many kilometres in each part?

The Planets

Planet	Distance From Sun in Kilometres
Mercury	58 000 000
Venus	107 000 000
Earth	150 000 000
Mars	227 000 000
Jupiter	774 000 000
Saturn	1 419 000 000
Uranus	2 854 000 000
Neptune	4 472 000 000
Pluto	5 880 000 000

Exercises

Write an equation to solve each problem.

- How much farther is Saturn from the sun than Earth?

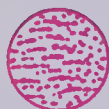
Write an equation: $1\,419\,000\,000 - \blacksquare = \blacktriangle$

Solve: $\blacktriangledown = \blacktriangle$

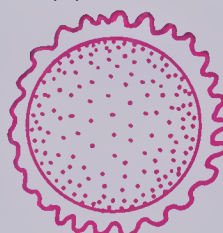
Write a statement:

- How much farther is Venus from the sun than Mercury?
- When Venus and Earth are on the opposite sides of the sun, how far apart are the two planets?

Venus



Sun



Earth

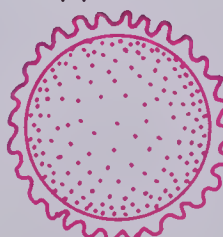


- When Jupiter and Mars are on the opposite sides of the sun, how far apart are the two planets?

Jupiter



Sun



Mars



5. When Pluto and Neptune are on the opposite sides of the sun, how far apart are the two planets?
6. When Venus and Mercury are on the *same* side of the sun, how far apart are the two planets?



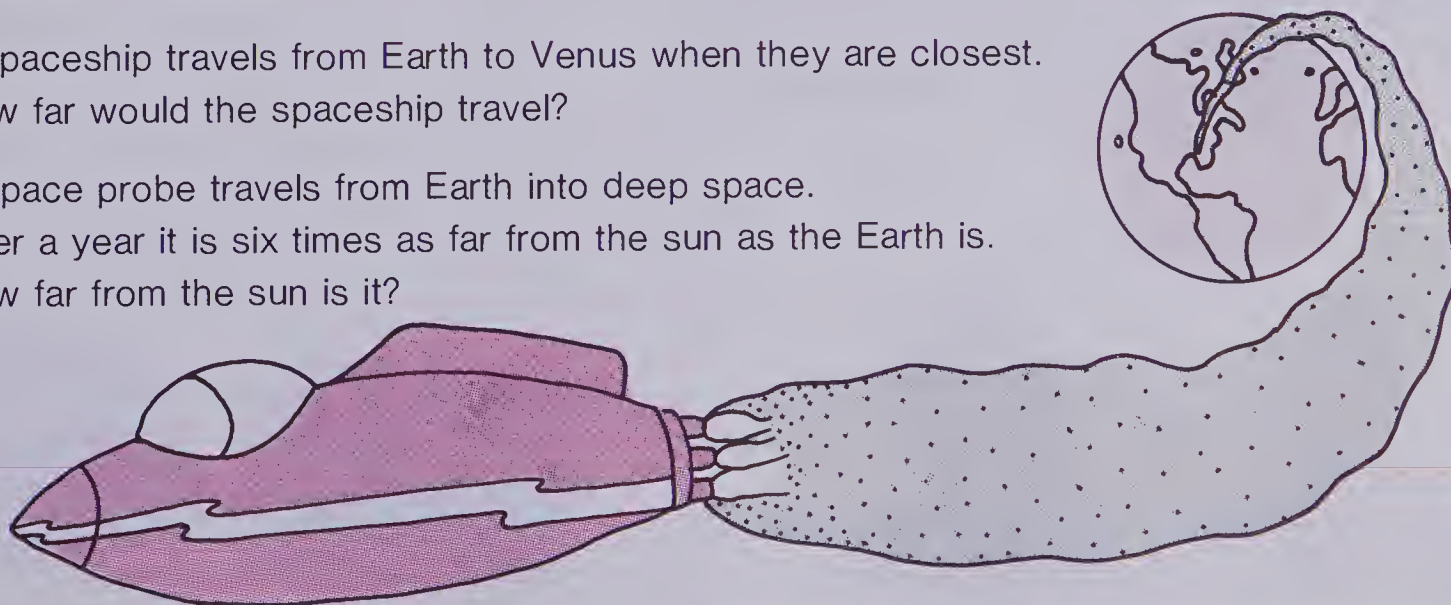
7. When Jupiter and Earth are on the same side of the sun, how far apart are the two planets?



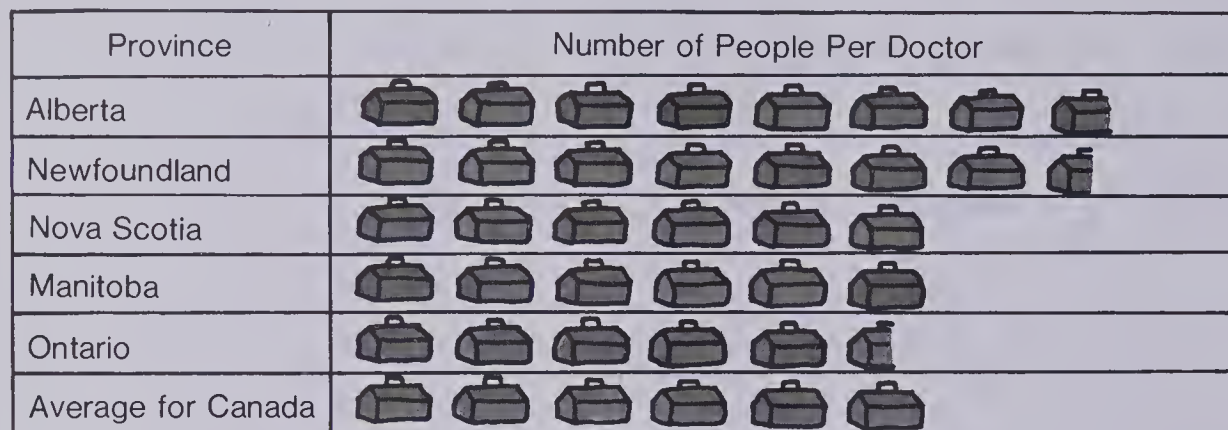
8. When Pluto and Uranus are on the same side of the sun, how far apart are the two planets?




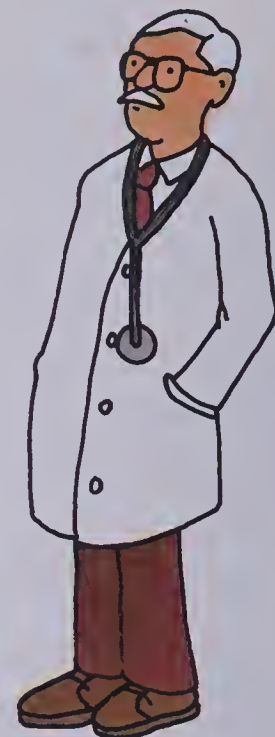
9. When Earth and Mars are closest, how many kilometres must a spaceship travel to go from Earth to Mars?
10. A spaceship travels from Earth to Venus when they are closest. How far would the spaceship travel?
- ★ 11. A space probe travels from Earth into deep space. After a year it is six times as far from the sun as the Earth is. How far from the sun is it?



Pictographs



 represents 100 people.

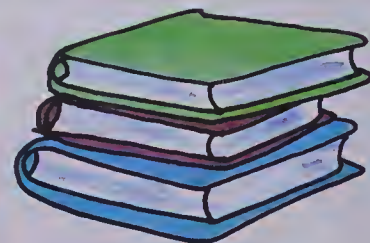
































- Which province has the least number of people per doctor?
- Which province has the greatest number of people per doctor?
- How many people per doctor in Newfoundland? Ontario?
- What is the average number of people per doctor in Canada?
- Which provinces are above the Canadian average?
- Draw a pictograph to show the number of air passengers between certain cities.


Montreal	— Toronto	80 000
Calgary	— Edmonton	30 000
Calgary	— Toronto	10 000
Vancouver	— Toronto	20 000
Ottawa	— Toronto	45 000

Activity

Open a library book.
Choose 10 lines of print.
Count the number of times each vowel is used.
Make a comparison using a pictograph.



Province	Number of Households with Colour Television Sets
Quebec	        
Ontario	             
Saskatchewan	 
British Columbia	    

 represents 100 000 sets.

8. Which province has the highest number of households with colour television? the lowest number?
9. How many households in Quebec have colour television? in Saskatchewan? in British Columbia?
10. How many more households in Ontario have colour television sets than in British Columbia?
11. Canadian imports in millions of dollars from certain countries are shown. Draw the pictograph. Use a symbol to represent \$10 000 000 of imports.

Switzerland	\$ 80
South Korea	15
Mexico	45
Netherlands	85
Sweden	110



12. The approximate number of students in Grade 5 in certain parts of Canada is given in the table. Show the data in a pictograph. *Hint:* Round to the nearest multiple of five hundred first. Use a symbol to represent 1000 students.

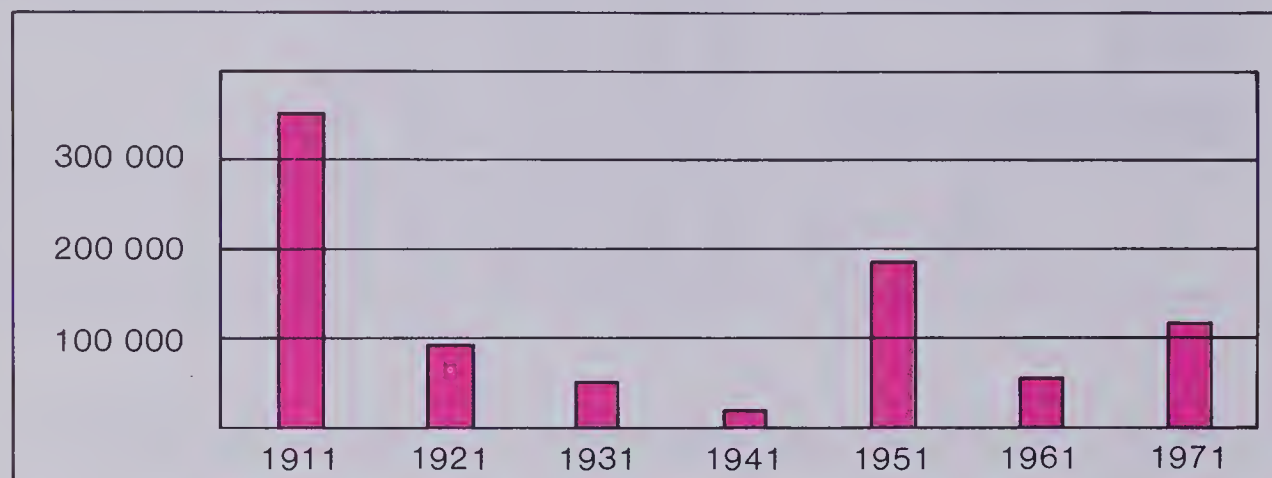
Prince Edward Island	2 560
Nova Scotia	16 130
New Brunswick	15 580
Northwest Territories	1 600
Newfoundland	15 100



Bar Graphs

A bar graph provides a message quickly and presents data for comparisons.

Canadian Immigration, 1911 to 1971



1. In which of the years shown did the greatest number of people come to Canada?
2. In which of the years shown did the least number of people come to Canada?
3. In which year did about twice as many people come to Canada as did in 1921?
4. In 1911 there were about how many times as many immigrants to Canada as in 1971?
5. Construct and label a bar graph:
"Lengths of some rivers in Canada."
Round each length to the nearest 50 km.

Mackenzie	4242 km
Yukon	3186 km
St. Lawrence	3059 km
Nelson	2576 km
Churchill	1932 km
Peace	1923 km

BRAINTICKLER

Copy and complete to make this a *magic square*.

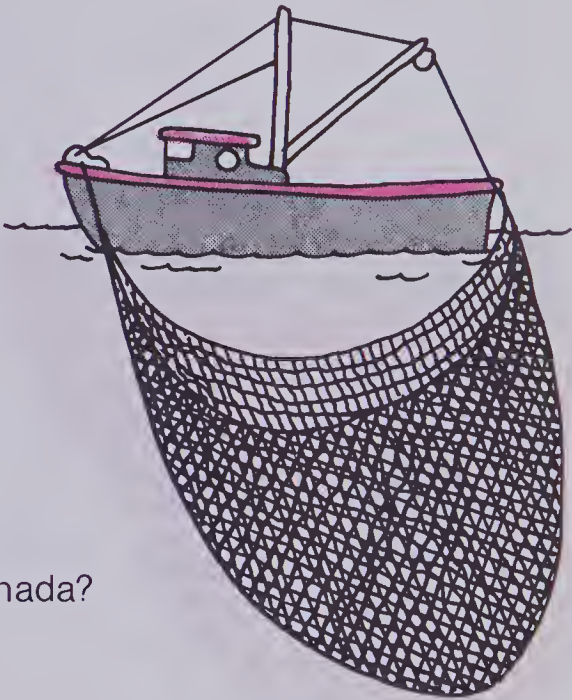
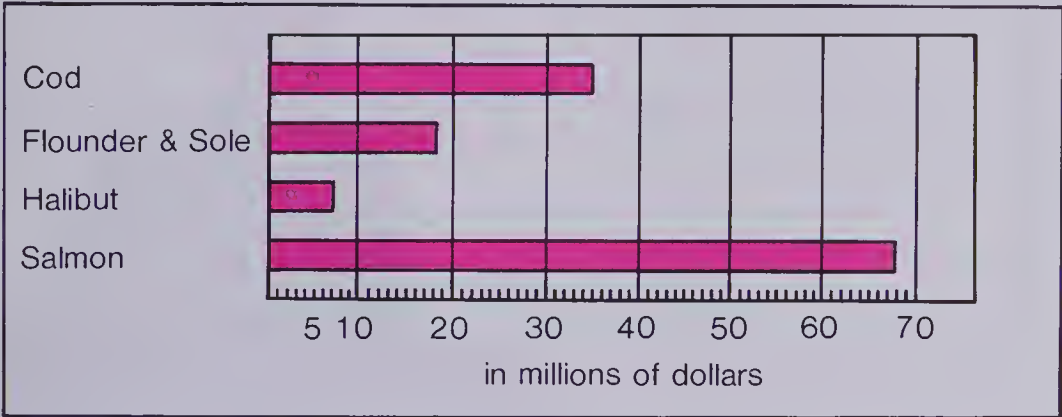
5.36		4.02
	3.40	

Magic sum = 10.20

Sea Fisheries

The Government keeps a record of the catches from the seawaters around Canada's shores.

Value of Catches in Canadian Seawaters



1. Which of the catches shown brings the most money to Canada?
2. Which of the catches shown brings the least money?
3. What catch is about half the value of the salmon catch?
4. What is the value of the halibut catch?
5. What information is being compared in the bar graph?

Draw a bar graph to show this data.

6. Number of Immigrants to the United States from Canada

Year	Number
1976	21 380
1972	25 240
1968	20 420
1964	12 570
1960	11 250
1956	9 780

BRAINTICKLER

The typist got letters and numbers mixed. What digits (0, 1, 2, 3, . . . , 9) should replace the letters?

2R18
+197T

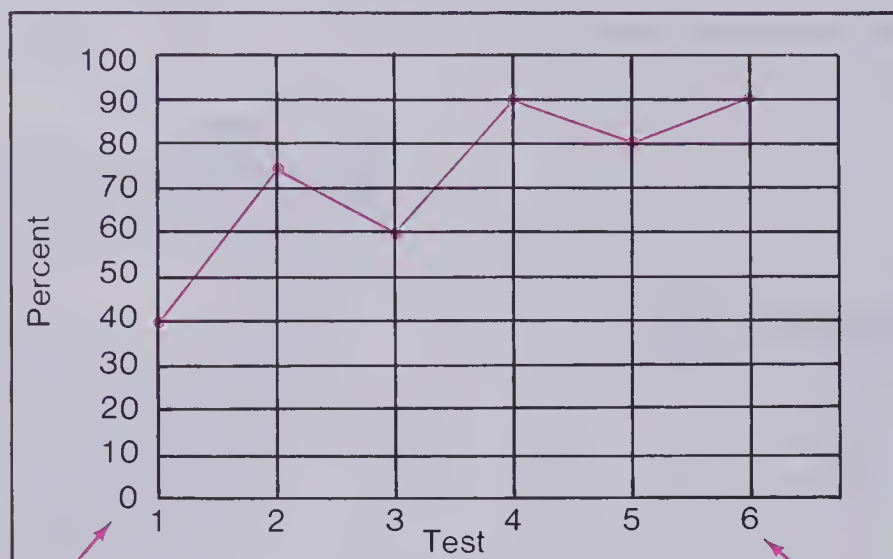
X5S3

814F
-1M75

Z7N5

Broken Line Graphs

Metro kept a record of his test marks.



Vertical scale

Horizontal scale



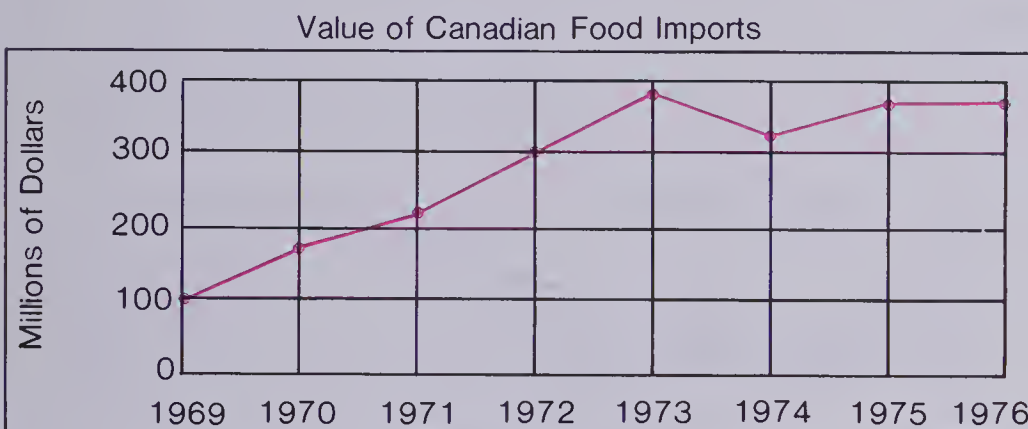
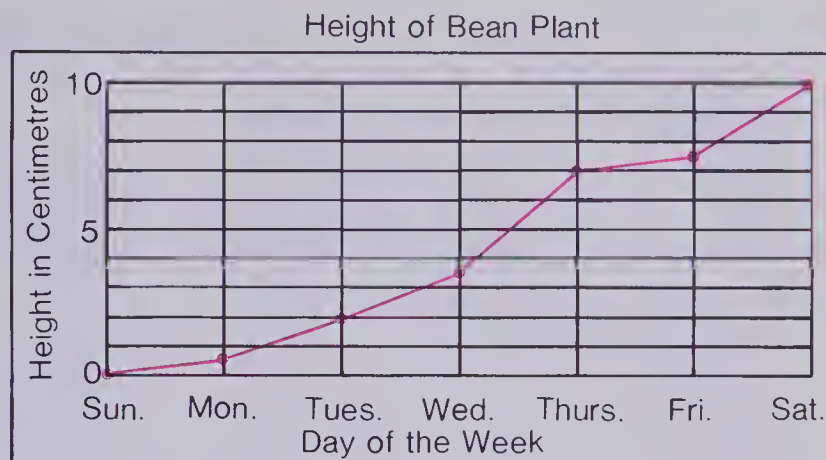
Broken line graphs are used to show change.

Exercises

1. What do the numbers along the horizontal scale indicate?
2. What do the numbers along the vertical scale indicate?
3. Did Metro's test mark improve from Test 1 to Test 2?
4. What happened to Metro's test mark from Test 2 to Test 3?
5. Was there more improvement between Test 1 and Test 2 or Test 5 and Test 6?
6. In what direction is the slant of the line that shows improvement? that shows a decline in marks?
7. Does a point on the line between Test 3 and Test 4 indicate another test and mark? Explain.

Karen made a graph when her bean plant started to grow.

8. What change is being shown?
9. Between which two days is the greatest change shown?
10. What was the height of the plant on Thursday?



11. What information is provided in the graph?
12. During which year did the value of food imports increase the most over the previous year?
13. In which year was there a decrease in food imports compared to the previous year?
14. What was the approximate value of food imports in 1975?
15. Draw a broken line graph.

Number of air passengers between Vancouver and Winnipeg

1968	1969	1970	1971	1972	1973	1974
63 000	82 000	90 000	85 000	95 000	121 000	128 000

16. Several students recorded the length of their shadows every 30 min. Here is what David wrote:

Time	09:00	09:30	10:00	10:30	11:00	11:30	12:00	12:30	13:00	13:30
Length in Centimetres	130	110	94	82	74	70	68	70	74	82

Draw a broken line graph for this data.

Tune Up Part 1

Round each to the nearest hundred.

1. 467

2. 5678

3. 72 340

4. 7555

5. 64 440

Calculate.

$$\begin{array}{r} 6. \quad 23.1 \\ \quad 4.6 \\ + \quad 3.5 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 18.12 \\ \quad 26.29 \\ + \quad 80.01 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 43.15 \\ \quad 23.80 \\ + \quad 89.07 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 89 \\ \quad -26 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 8.9 \\ \quad -5.2 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 6.04 \\ \quad -1.87 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 14.00 \\ \quad - 8.21 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 317 \\ \quad \times 64 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 374 \\ \quad \times 0.8 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 127.4 \\ \quad \times 4.8 \\ \hline \end{array}$$

16. $346 \div 10$

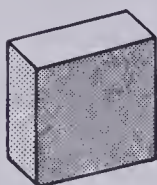
17. $564 \div 100$

18. $37 \overline{)654}$

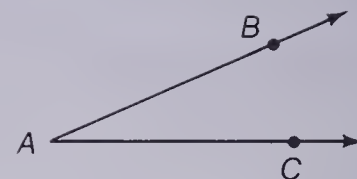
19. $64 \overline{)7094}$

Tune Up Part 2

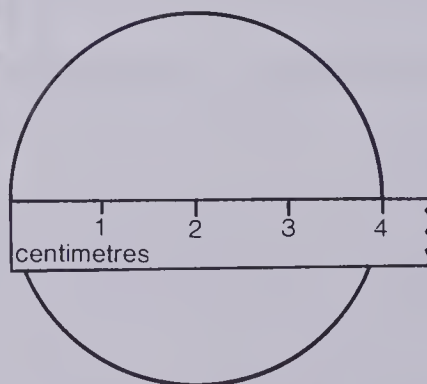
1. This is a tall, thin box.
Draw a shallow, wide box.



2. Name this angle.



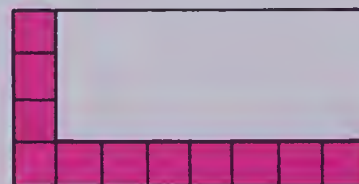
3. What is the radius of this circle?



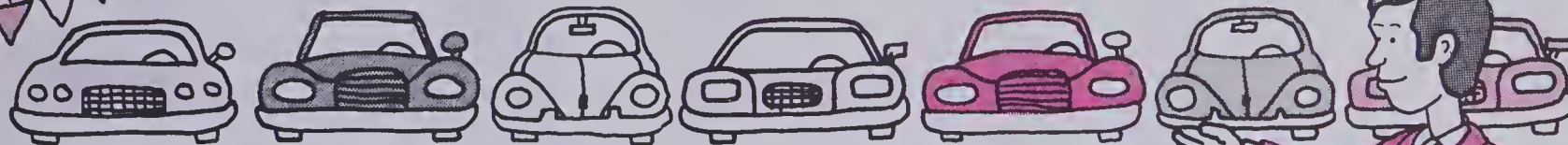
4. Calculate the perimeter of this rectangle.



5. Calculate the area of this rectangle.



Car Rental Manager



Mr. Henri Herman manages the A-B Car Rental Company.

He has cars of various sizes and styles.

1. The A-B Car Rental Company has:

15 Luxury cars with air conditioning

35 Standard 4-door cars

75 Compact 4-door cars

25 Compact 2-door cars.

Show the data in a pictograph.

2. The revenue for the month of July from each set of cars is shown.

Luxury \$8100

Standard \$19 600

Compact 4-door \$42 900

Compact 2-door \$13 500

(a) Round each amount to the nearest thousand.

(b) Show the rounded data in a bar graph.

3. Mr. Herman kept a log of the distances each car was driven on each rental. The odometer readings in kilometres of car 25B are shown on the rental log:

		Car #25B		
		Kilometres		Distance
Rental #		Take Out	Return	
1		3 512	8 122	
2		8 140	9 080	
3		9 100	9 208	
4		9 222	13 700	
5		13 727	15 090	

(a) Copy and complete the chart.

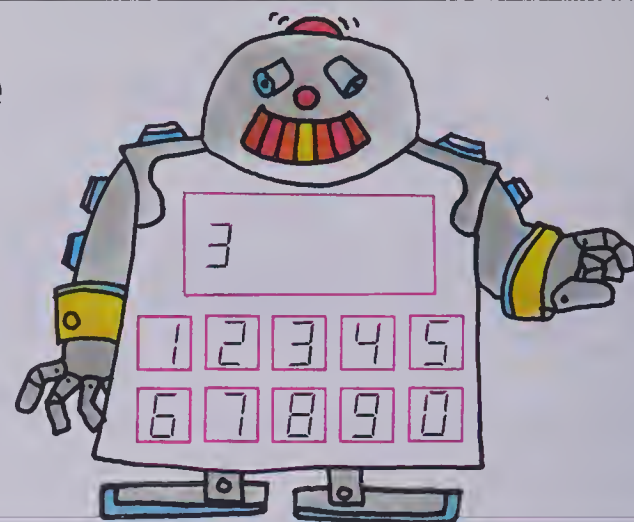
(b) Draw a broken line graph to show distances driven on the rentals. (Round first!)

- ★ 4. Which type of car returned the most money per car during the month of July?

Space Age

Students from Constellation Canis Major have a robot.

When a number is put in (input), Omega-Y uses a *rule* and flashes back an answer (output).



Exercises

1. Rainus, a student, gave Omega-Y some numbers.

Input	Output
3	9
4	10
5	11

What rule did Omega-Y use?

3. Omega-Y used the rule:
Input — a number
Output — 4 times the number.
Copy and complete this table.

Input	Output
1	4
2	8
6	
8	
12	
15.5	
38.9	

2. Angella recorded these inputs and outputs.

Input	Output
7	30
9	32
11	34
13	
15	
17	

- (a) Copy and complete the table.
- (b) What rule did Omega-Y use?

4. Omega-Y used the rule:
Input "× 2.3" = Output.

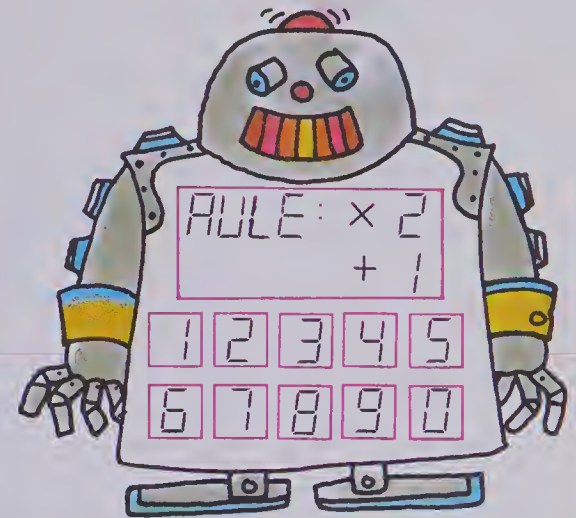
Input	Output
1	2.3
2	4.6
3	
5	
10	
15	

Copy and complete the table.

Omega-Y

Starius, another student of Constellation Canis Major, recorded this table of inputs and outputs.

Input	Output
1	3
2	5
3	7
4	9



Omega-Y used the rule:

Multiply by 2 and add 1.

Exercises

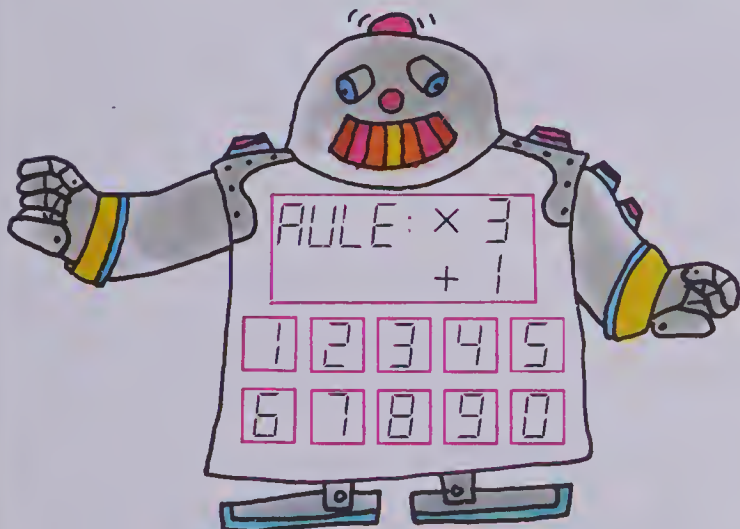
- Use the rule: Multiply by 2 and add 1.

Copy and complete each table.

Input	Output
4	
5	
6	
7	

Input	Output
10	
20	
30	
40	

- Copy and complete this table. Watch for the new rule!



Input	Output
1	4
2	■
3	10
4	■
7	■

- Copy and complete the table.
Rule: Multiply by 4 and add 2.

Input	Output
1	
2	
3	
5	
10	
15	

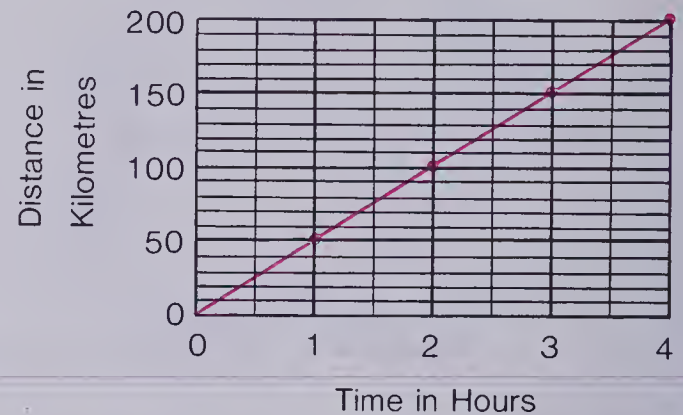
Time and Distance

Tewari was planning a car trip. "We will average about 50 km in 1 h. In 2 h we will go 100 km."

He made this table.

Time in Hours	0	1	2	3	4
Distance in Kilometres	0	50	100	150	200

He made this graph.



Exercises

1. What did Tewari do to calculate how far they would go in 2 h? in 3 h?
2. Use the graph. Approximately how far would they go in 1.5 h? 2.5 h?
3. To make the table Tewari used the rule: Multiply the number of hours by ■.
4. Tewari made another plan. He planned to travel 90 km in each hour.
 - (a) Copy and complete this table.

Time in Hours	0	1	2	3	4	5
Distance in Kilometres	0	90				

- (b) What rule did Tewari use this time?
5. Make a line graph using the data in the table in Exercise 4. Use a graph similar to the one at the top of this page.
 6. Tewari's older sister, Grace, planned to ride her motorbike. She planned to travel 40 km each hour.
 - (a) Copy and complete the table.

Time in Hours	0	1	2	3	4	5
Distance in Kilometres	0	40				

- (b) What rule did Grace use?
- (c) Make a line graph to show the information.

7. (a) Copy and complete this table for a bicycle trip at 15 km/h (fifteen kilometres per hour).

Time in Hours	0	1	2	3	4	5
Distance in Kilometres						

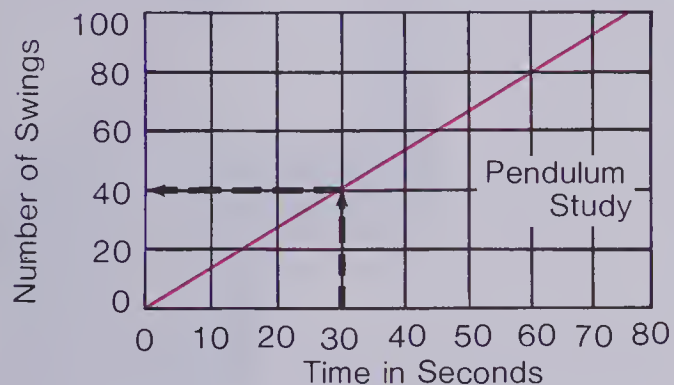
- (b) What rule did you use? (c) Make a line graph.
8. (a) Copy and complete this table for a trip at 75 km/h.

Time in Hours	0	1	2	3	4	5
Distance in Kilometres	0	75				

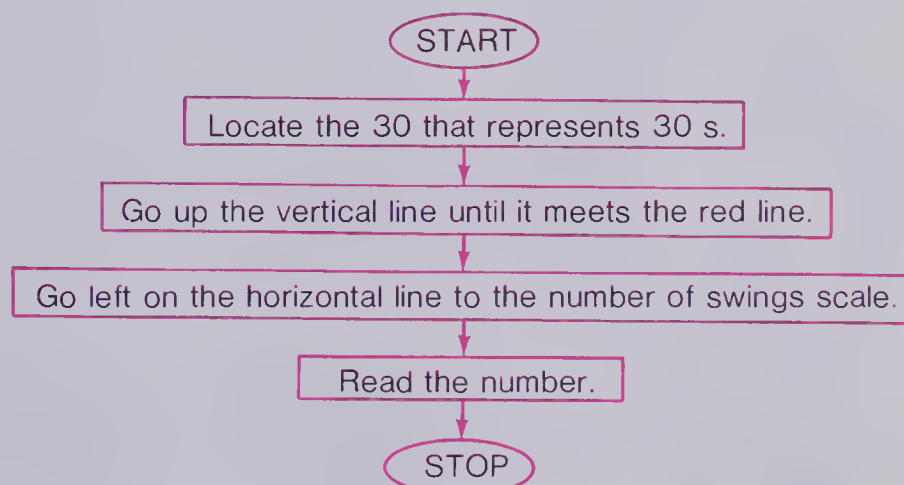
- (b) What rule did you use? (c) Make a line graph.
9. (a) Copy and complete this table for an airplane trip at 900 km/h.

Time in Hours	0	1	2	3	4
Distance in Kilometres					

- (b) What rule did you use? (c) Make a line graph.
- 10.



Jeff's group did a pendulum experiment. This is the graph they drew from the data. Lori studied the graph.



- (a) To find the number of swings the pendulum made in 30 s, Lori followed this flow chart. The number of swings is 40.
- (b) About how many swings did the pendulum make in
- (i) 60 s? (ii) 15 s?
- (iii) 45 s? (iv) 50 s?

On Parade

The Boy Scouts lined up for a parade.

	4	Pete	Larry	Gerry	Shawn	Jim
	3	Harry	Kirk	Jack	Frank	Len
Row	2	Mark	Dick	Mike	Rob	Walt
	1	Bill	John	Bob	Chas	Ray
		1	2	3	4	5
		Column				

Exercises

- Rob is at place (4, 2). What column is he in?
What row is he in?
- Harry is at place (1, 3). What column is he in?
What row is he in?
- Who is at the place (2, 3)?
- Who is at the place (3, 2)?
- How is (2, 3) different than (3, 2)?
How are they the same?

Use this rule:

Always name the column first, then the row.



- Who is in the spot?

(a) (4, 2) (b) (1, 4) (c) (4, 1) (d) (5, 2)

- Write the number pair for the place of each Boy Scout.

(a) Mark (b) Larry (c) Frank (d) Len

Going Camping

The tents in a girl's camp are set up in columns and rows as shown:

	4	Wren	Wolf	Canary	Coyote	Owl
Row	3	Beaver	Fox	Hawk	Duck	Robin
	2	Bat	Deer	Crow	Goose	Bear
	1	Cat	Moose	Eagle	Swan	Cub
		1	2	3	4	5
		Column				

The location of a tent is given by an **ordered pair**: first the column number, then the row number.

The Bear tent is located by the ordered pair (5, 2).

Exercises

1. Give the name of the tent at each location.

- (a) (2, 1) (b) (4, 3) (c) (5, 4) (d) (1, 4) (e) (3, 3)
 (f) (2, 3) (g) (4, 4) (h) (5, 1) (i) (3, 2)

2. Write the *ordered pair* that locates each tent.

- (a) Beaver (b) Canary (c) Bear (d) Deer (e) Swan
 (f) Coyote (g) Bat (h) Eagle (i) Robin

3. Which tent is at (4, 2)?

Which tent is at (2, 4)?

Does (2, 4) and (4, 2) locate the same tent?

4. Marty lives in Cub tent.

She walked to Wren tent.

How many rows did she cross?

How many columns did she cross?



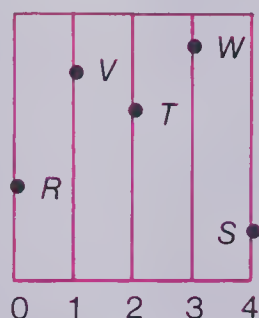
5. Shelley went from (4, 3) to (2, 1).

How many rows did she cross?

How many columns did she cross?

Vertical and Horizontal

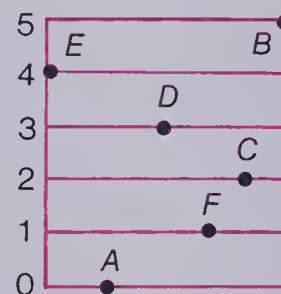
Grid 1



Vertical lines

Point V — on vertical
line 1

Grid 2



Horizontal lines

Point E — on horizontal
line 4

Exercises

Use Grids 1 and 2.

1. Name the line each letter is on.

(a) T (b) S (c) B (d) A (e) C (f) W

2. Name the letter on the line.

(a) vertical line 0 (b) horizontal line 1
(c) vertical line 1 (d) horizontal line 3
(e) horizontal line 4

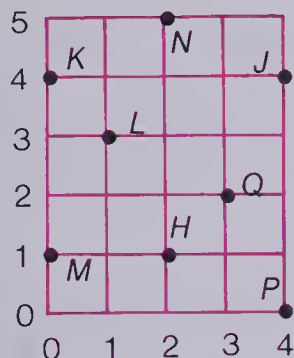
3. Name each line as *horizontal* or *vertical*.

(a) (b) (c) (d) (e) (f) (g) (h)

4. Is each letter a horizontal or vertical line?

A K C J E F B G D H I

Using Grids



Point Q — on vertical line 3
— on horizontal line 2

(3, 2) is called an **ordered pair**.



Exercises

1. Name the letters on these lines.

- (a) vertical line 1, horizontal line 3
(c) vertical line 4, horizontal line 0

- (b) vertical line 2, horizontal line 5
(d) vertical line 2, horizontal line 1

2. Name the letters with these ordered pairs. Remember! Vertical first.

- (a) (3, 2) (b) (0, 1) (c) (0, 4) (d) (4, 4)

3. Write the ordered pair for these points. Remember! The vertical line first.

A B C D E F
G H I J K L M

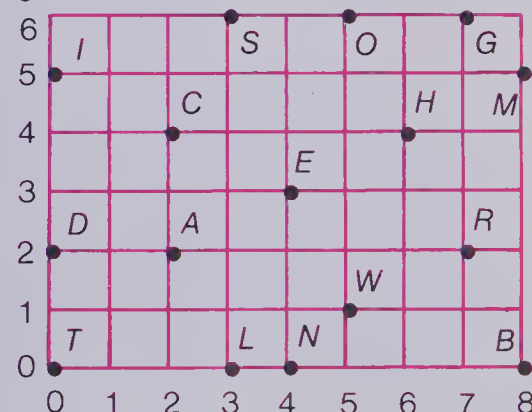


4. How is (5, 3) different from (3, 5)?

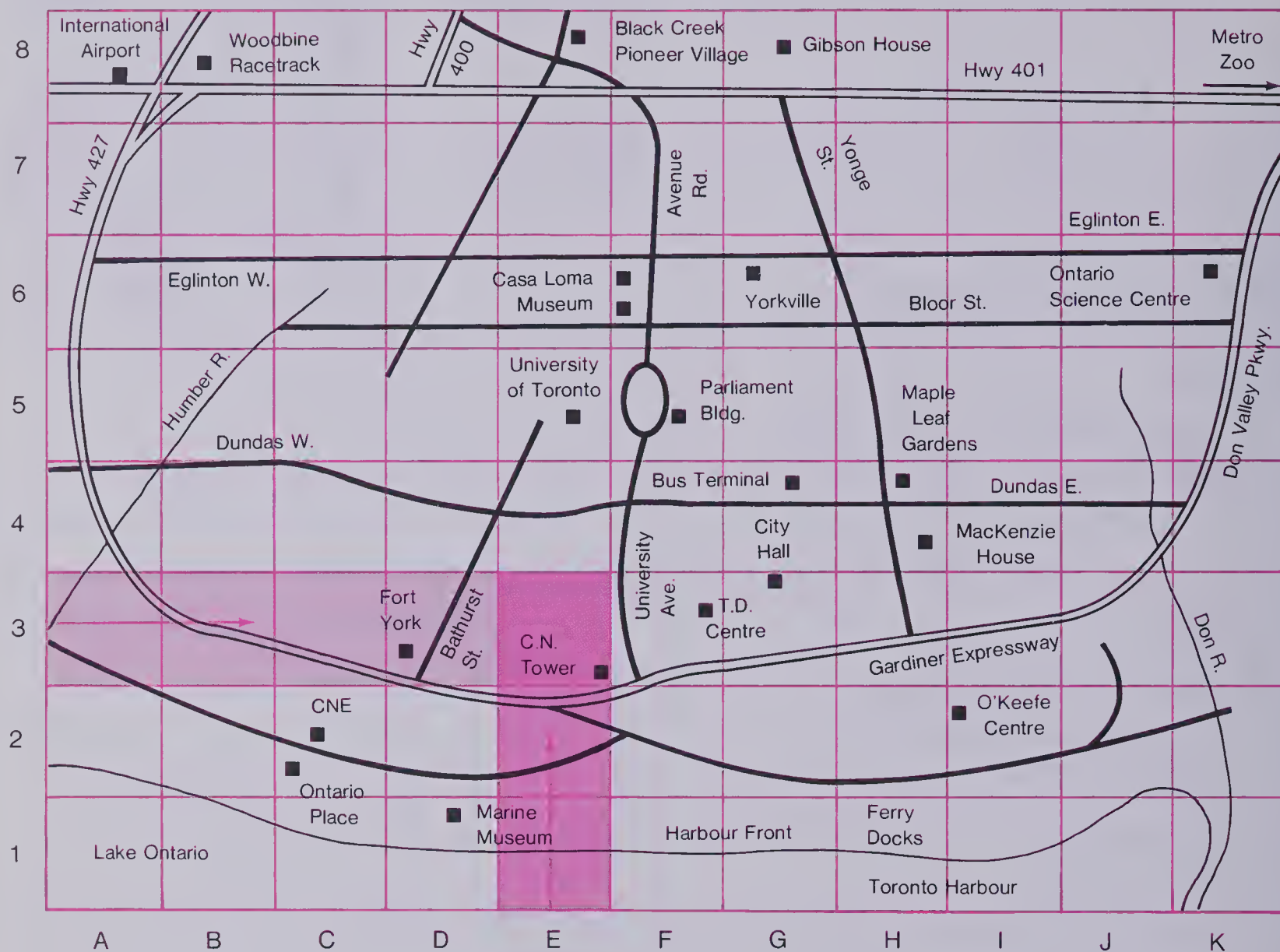
5. Copy the ordered pairs below. Match the letters with the pairs.

What rides on a gold broom?

(2, 2) (7, 2) (0, 5) (2, 4) (6, 4)
(5, 1) (0, 5) (0, 0) (2, 4) (6, 4)



Road Maps



Maps of cities or provinces often have a grid drawn on them in order to help the viewer locate interest points. Refer to the map. The C.N. Tower is located in the square identified by E3.

To find the C.N. Tower:

Locate E on the horizontal scale. Move upward.

Locate 3 on the vertical scale. Move to the right.

Where the two strips intersect, is square E3.

In this square we easily locate the C.N. Tower.

Exercises

1. Use the ordered pair to locate each.

(a) Bus Terminal — G4

(c) City Hall — G3

(e) Casa Loma — F6

(g) Woodbine Racetrack — B8

(b) Ontario Science Centre — K6

(d) Ontario Place — C2

(f) Black Creek Pioneer Village — E8

(h) O'Keefe Centre — I2

2. Give the location of each by means of an ordered pair (letter, number).

(a) Parliament Building

(b) Airport

(c) Ferry Docks

(d) Maple Leaf Gardens

(e) Gibson House

(f) T.D. Centre

3. An atlas usually has an index. The index is an alphabetical list of cities and places.

Place
London, England

Page
28

Location
C3

Use an atlas and locate these places. Name the country each is in.

(a) Paris

(b) Bangkok

(c) Bombay

(d) Brussels

(e) Budapest

(f) Moscow

(g) Tokyo

(h) Melbourne

(i) Montevideo

(j) Capetown

(k) Peking

(l) Istanbul

Activity

Work with a partner.

Use a large map or atlas.

Locate and name a place.

Give the location by means of an ordered pair such as D4.

Ask your partner to find it.

Take turns.

The person locating the most places is the winner.

Make up your own rules.



Chapter Test

1. Solve.

(a) $6 + \blacksquare = 13$

(b) $3 \times T = 15$

(c) $14 - 8 = M$

(d) $25 \div 5 = \blacksquare$

(e) $20 \div N = 10$

(f) $\blacksquare + 9 = 16$

2. Solve.

(a) $N < 3$

(b) $5 > T$

(c) $17 - 7 > A$

3. Graph the solutions on the number line.

(a) $4 > B$

(b) $N < 1 + 5$

(c) $8 + 3 = X$

4. Russ Eagle Feathers rode his ten-speed bicycle 17 km altogether on the weekend. On Saturday he rode 7 km.

How far did he ride on Sunday?

(a) Write a number sentence for the solution.

(b) Solve the number sentence.

5. Draw a bar graph to show these facts.

Where Immigrants to Canada Came From in 1976.

Britain	36 000	Portugal	16 000
United States	26 000	India	13 000
West Indies	24 000	Hong Kong	13 000

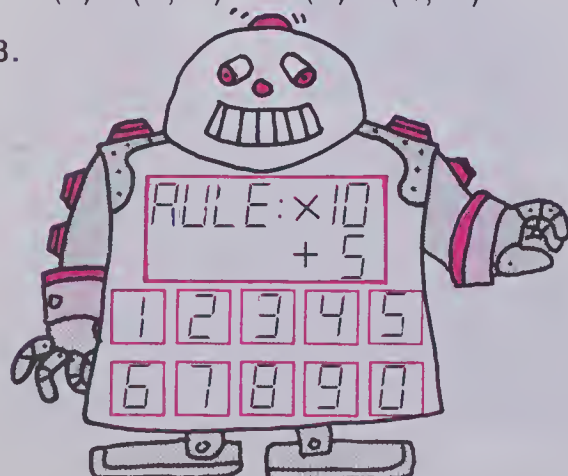
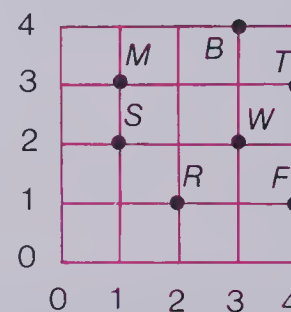
6. Write the ordered pair for the point.

(a) M (b) F

7. What letter is identified by:

(a) $(2, 1)$? (b) $(4, 3)$?

8.



Rule:

Multiply by 10 and add 5.

Copy and complete the table.

Input	0	1	2	3	5
Output					

Cumulative Review

Round to the nearest thousand.

1. 47 300

2. 1180

3. 25 500

4. 316 230

5. 69 700

Add.

$$\begin{array}{r} 6. \quad 34 \\ + 67 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 999\,400 \\ + 123\,298 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 3.34 \\ + 1.25 \\ \hline \end{array}$$

9. $48.3 + 5.77$

Subtract.

$$\begin{array}{r} 10. \quad 78 \\ - 29 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 988\,005 \\ - 711\,688 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 18.35 \\ - 9.41 \\ \hline \end{array}$$

13. $57.34 - 6.7$

Multiply.

$$\begin{array}{r} 14. \quad 24.56 \\ \times 0.3 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 234 \\ \times 0.01 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 638 \\ \times 45 \\ \hline \end{array}$$

17. 23×1000

Divide.

18. $9 \overline{)176}$

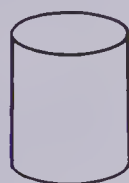
19. $26 \overline{)783}$

20. $64 \overline{)8391}$

21. $234 \div 100$

22. Match.

- (a) cone _____
- (b) pyramid _____
- (c) sphere _____
- (d) cylinder _____



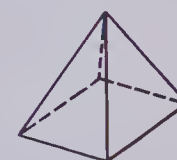
(i)



(ii)



(iii)

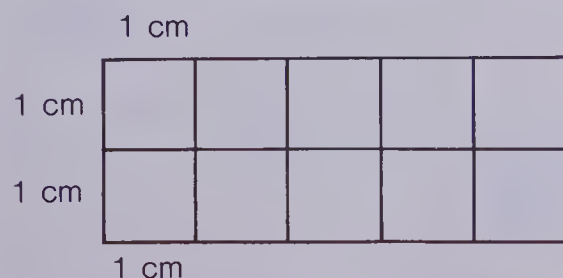


(iv)

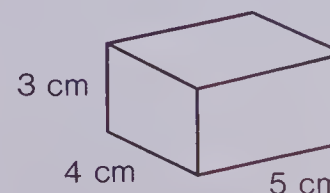
23. How many minutes past 12:00?



24. Find the (a) perimeter (b) area.



25. Calculate the volume.



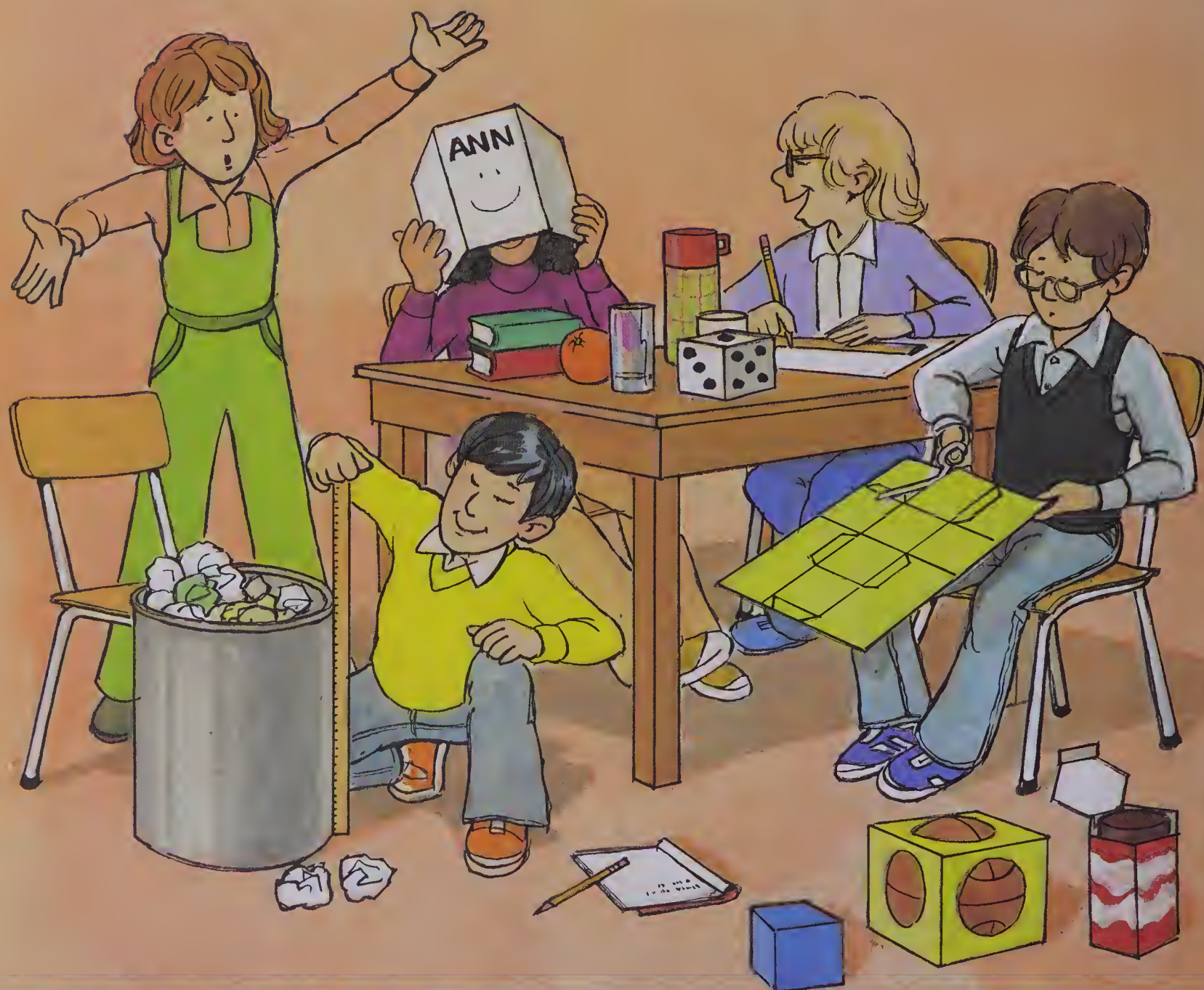
Chapter 7

Number Theory

Divisibility

Factors and Multiples

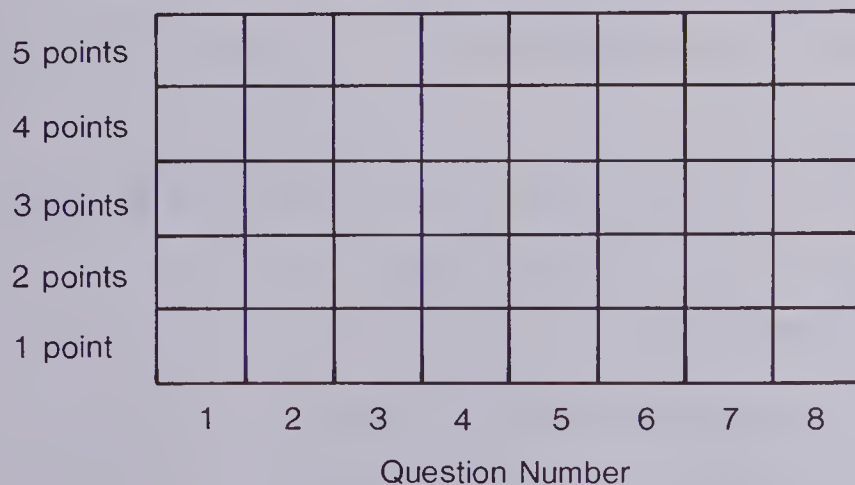
Primes and Composites



Tune Up

1. (a) 3×7 (b) 9×6 (c) 8×4 (d) 5×9 (e) 9×9
2. (a) $\begin{array}{r} 34 \\ \times 3 \\ \hline \end{array}$ (b) $\begin{array}{r} 46 \\ \times 6 \\ \hline \end{array}$ (c) $\begin{array}{r} 19 \\ \times 7 \\ \hline \end{array}$ (d) $\begin{array}{r} 88 \\ \times 5 \\ \hline \end{array}$ (e) $\begin{array}{r} 76 \\ \times 9 \\ \hline \end{array}$
3. (a) 30×70 (b) 800×60 (c) 700×200 (d) 271×10 (e) 375×100
4. (a) $\begin{array}{r} \$8.53 \\ \times 9 \\ \hline \end{array}$ (b) $\begin{array}{r} \$13.72 \\ \times 6 \\ \hline \end{array}$ (c) $\begin{array}{r} \$57.04 \\ \times 8 \\ \hline \end{array}$ (d) $\begin{array}{r} \$628.15 \\ \times 7 \\ \hline \end{array}$ (e) $\begin{array}{r} \$198.35 \\ \times 4 \\ \hline \end{array}$
5. (a) $36 \div 4$ (b) $49 \div 7$ (c) $28 \div 4$ (d) $72 \div 8$ (e) $54 \div 9$
6. (a) $10 \overline{)230}$ (b) $10 \overline{)700}$ (c) $100 \overline{)8000}$ (d) $100 \overline{)1000}$ (e) $1000 \overline{)9000}$
7. (a) $4 \overline{)316}$ (b) $9 \overline{)405}$ (c) $8 \overline{)704}$ (d) $5 \overline{)285}$ (e) $7 \overline{)462}$
8. (a) $9 \overline{)4631}$ (b) $4 \overline{)6375}$ (c) $6 \overline{)7000}$ (d) $2 \overline{)4871}$ (e) $3 \overline{)6890}$

Copy the grid and make a bar graph of your results.
Each correct answer is worth 1 point.



Properties of Addition

Commutative Property

We can change the order of addends and *not* change the sum.

Examples of the properties

$$4 + 3 = 7$$

$$3 + 4 = 7$$

$$156 + 203 = 359$$

$$203 + 156 = 359$$

Associative Property

We can change the grouping of the addends and *not* change the sum.

$$(3 + 4) + 5 = 12$$

$$3 + (4 + 5) = 12$$

$$215 + (7 + 115) = 337$$

$$(215 + 7) + 115 = 337$$

Property of Zero

When we add zero to a number the sum is the number.

$$3 + 0 = 3$$

$$0 + 7 = 7$$

$$891 + 0 = 891$$

$$0 + 793 = 793$$

Exercises

Calculate.

1. $4 + 6 = N$

$$6 + 4 = N$$

$$\text{Is } 4 + 6 = 6 + 4?$$

3. $(3 + 7) + 9 = N$

$$3 + (7 + 9) = N$$

$$\text{Is } (3 + 7) + 9 = 3 + (7 + 9)?$$

5. $0 + 9 = N$

$$18 + 0 = N$$

2. $531 + 291 = N$

$$291 + 531 = N$$

$$\text{Is } 531 + 291 = 291 + 531?$$

4. $(631 + 25) + 746 = N$

$$631 + (25 + 746) = N$$

$$\text{Is } (631 + 25) + 746 = 631 + (25 + 746)?$$

6. $754 + 0 = N$

$$0 + 6375 = N$$

Complete.

7. $13 + 15 = 15 + \blacksquare$

8. $(395 + 521) + 674 = 395 + (\blacksquare + \blacktriangle)$

9. $7\ 358\ 203 + 0 = \blacksquare$

10. $0 + 635\ 468 = \blacksquare$

11. Can you write a zero property for subtraction? (*Hint*: $7 - 0 = 7$)

★ 12. Is there a commutative property for subtraction? (*Hint*: Is $6 - 5 = 5 - 6$?)

★ 13. Is there an associative property for subtraction? (*Hint*: Is $7 - (3 - 2) = (7 - 3) - 2$?)

Using Addition Properties

Associative Property

$$\begin{aligned}(6 + 5) + 4 &= 6 + (5 + 4) \\ &= 6 + 9 \\ &= 15\end{aligned}$$

Add by using grouping.

$$\begin{aligned}23 + 54 &= 23 + (50 + 4) \\ &= (23 + 50) + 4 \\ &= 73 + 4 \\ &= 77\end{aligned}$$

Commutative Property

$$3 + 4 = 4 + 3$$

$$\begin{aligned}\text{Add: } 17 + 4 + 3 + 16 &= 17 + 3 + 4 + 16 \\ &= 20 + 20 \\ &= 40\end{aligned}$$

Exercises

Copy and complete.

$$\begin{aligned}1. \quad 52 + 64 &= 52 + (60 + \blacksquare) \\ &= (52 + \blacktriangle) + \blacksquare \\ &= \blacktriangledown + \blacksquare \\ &= \bullet\end{aligned}$$

$$\begin{aligned}2. \quad 78 + 98 &= 78 + (\blacktriangle + \blacksquare) \\ &= (78 + \blacktriangle) + \blacksquare \\ &= \blacktriangledown + \blacksquare \\ &= \bullet\end{aligned}$$

Add.

$$3. \quad 53 + 82 \quad 4. \quad 223 + 84 \quad 5. \quad 556 + 88 \quad 6. \quad 479 + 21 \quad 7. \quad 576 + 79$$

$$8. \quad 23 + 8 + 7 + 32 \quad 9. \quad 470 + 27 + 30 + 123 \quad 10. \quad 56 + 18 + 14 + 22$$

11.	3	12.	26	13.	407	14.	2316
	4		22		219		4425
	7		34		293		6544
	6		18		538		5665
	5		14		781		6348
	3		18		662		+ 7722
	+ 5		+ 36		+ 117		<hr/>
	<hr/>		<hr/>		<hr/>		

Properties of Multiplication

Commutative Property

We can change the order of the factors and *not* change the product.

Examples of the properties

$$4 \times 5 = 20$$

$$5 \times 4 = 20$$

$$11.3 \times 12.3 = 138.99$$

$$12.3 \times 11.3 = 138.99$$

Associative Property

We can change the grouping of the factors and *not* change the product.

$$(3 \times 2) \times 7 = 6 \times 7$$

$$= 42$$

$$3 \times (2 \times 7) = 3 \times 14$$

$$= 42$$

$$(7.4 \times 6) \times 10.2 = 44.4 \times 10.2$$

$$= 452.88$$

$$7.4 \times (6 \times 10.2) = 7.4 \times 61.2$$

$$= 452.88$$

Property of 1

When we multiply a number by 1 the product is the number.

$$8 \times 1 = 8$$

$$1 \times 19 = 19$$

$$302 \times 1 = 302$$

$$1 \times 1976 = 1976$$

Property of 0

When we multiply a number by 0 the product is 0.

$$6 \times 0 = 0$$

$$0 \times 27 = 0$$

$$7165 \times 0 = 0$$

$$0 \times 1\,365\,461 = 0$$

Exercises

Calculate.

1. $7 \times 9 = N$
 $9 \times 7 = N$
 Is $7 \times 9 = 9 \times 7$?

3. $(9 \times 11) \times 4 = N$
 $9 \times (11 \times 4) = N$
 Is $(9 \times 11) \times 4 = 9 \times (11 \times 4)$?

5. $7 \times 1 = \blacksquare$
 $1 \times 9 = \blacksquare$

7. $8 \times 15 = 15 \times \blacksquare$

9. $8 \times 0 = N$

2. $463 \times 7.2 = N$
 $7.2 \times 463 = N$
 Is $463 \times 7.2 = 7.2 \times 463$?

4. $(7.2 \times 6) \times 11.9 = N$
 $7.2 \times (6 \times 11.9) = N$
 Is $(7.2 \times 6) \times 11.9 = 7.2 \times (6 \times 11.9)$?

6. $615\,716 \times 1 = N$
 $1 \times 3\,060\,609 = N$

8. $(6 \times 72) \times 8 = 6 \times (72 \times \blacksquare)$

10. $1\,765\,342 \times 0 = N$

Property Practice

Commutative Property

$$3 \times 2 = 2 \times 3$$

$$\begin{array}{r} 8 \\ \times 6.385 \\ \hline \end{array} \longrightarrow \begin{array}{r} 6.385 \\ \times 8 \\ \hline 51.080 \end{array}$$

Associative Property

$$(6 \times 3) \times 5 = 6 \times (3 \times 5) \\ = 6 \times 15$$

We can multiply using grouping of factors.

$$\begin{aligned} 432 \times 42 &= 432 \times (7 \times 6) \\ &= (432 \times 7) \times 6 \\ &= 3024 \times 6 \\ &= 18\,144 \end{aligned}$$

Exercises

Use the commutative property and multiply.

$$\begin{array}{r} 1. \quad 9 \\ \times 8.34 \\ \hline \end{array} = \begin{array}{r} 8.34 \\ \times \blacktriangle \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 8 \\ \times 2.56 \\ \hline \end{array} = \begin{array}{r} \blacksquare \blacksquare \blacksquare \\ \times \blacksquare \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 7 \\ \times 0.34 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 9 \\ \times 3.546 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 6 \\ \times 123.64 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 9 \\ \times 191.4 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 4 \\ \times 205.05 \\ \hline \end{array}$$

Use factors to multiply.

$$\begin{aligned} 8. \quad 39 \times 24 &= 39 \times (6 \times \blacksquare) \\ &= (39 \times \blacksquare) \times \blacksquare \\ &= \blacktriangledown \times \blacksquare \\ &= \bullet \end{aligned}$$

$$\begin{aligned} 9. \quad 37 \times 35 &= 37 \times (\blacktriangle \times \blacksquare) \\ &= (37 \times \blacktriangle) \times \blacksquare \\ &= \blacktriangledown \times \blacksquare \\ &= \bullet \end{aligned}$$

$$10. \quad 29 \times 15$$

$$11. \quad 31 \times 32$$

$$12. \quad 58 \times 45$$

$$13. \quad 84 \times 27$$

$$14. \quad 63 \times 18$$

$$15. \quad 32 \times 36$$

$$16. \quad 54 \times 45$$

$$17. \quad 428 \times 32$$

$$18. \quad 456 \times 72$$

$$19. \quad 976 \times 48$$

Use both properties.

$$\begin{array}{r} \star 20. \quad 32 \\ \times 8.81 \\ \hline \end{array} \longrightarrow \begin{array}{r} 8.81 \\ \times 32 \\ \hline \end{array} \longrightarrow \begin{array}{r} 8.81 \\ \times 8 \\ \hline \blacksquare \blacksquare \blacksquare \blacksquare \\ \times 4 \\ \hline \blacksquare \blacksquare \blacksquare \blacksquare \blacksquare \blacksquare \end{array}$$

$$\begin{array}{r} \star 21. \quad 56 \\ \times 6.321 \\ \hline \end{array} \quad \star 22. \quad \begin{array}{r} 25 \\ \times 16.46 \\ \hline \end{array} \quad \star 23. \quad \begin{array}{r} 35 \\ \times 23.844 \\ \hline \end{array}$$

Properties of Division

Property of Zero

- (a) Zero divided by a number is zero.
- (b) Division by zero has *no* meaning.

Examples of the properties

$$0 \div 6 = 0$$

$$0 \div 416 = 0$$

$2 \div 0$ has no meaning.

Property of 1

When we divide a number by 1 the quotient is the number.

$$3 \div 1 = 3$$

$$647 \div 1 = 647$$

Exercises

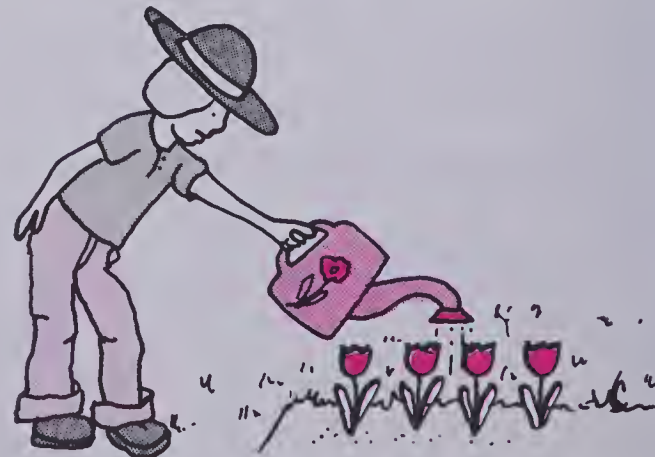
- You have a party.
4 friends come.
You share 0 pizzas.
How much pizza does each person get?
Write a number sentence.

- You have a party.
But no one comes.
You share 2 pizzas.
How much pizza do you get?
Write a number sentence.

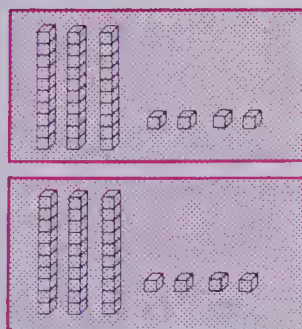
Calculate the answer, where possible.

- | | | | | |
|--------------------------|------------------------------|-----------------------------|-----------------------------|--------------------------|
| 3. $20 \div 4$ | 4. $6 \div 1$ | 5. $7 \div 0$ | 6. $0 \div 9$ | 7. $96 \div 6$ |
| 8. $360 \div 1$ | 9. $0 \div 90$ | 10. $54 \div 9$ | 11. $64 \div 8$ | 12. $10 \div 0$ |
| 13. $9 \overline{)279}$ | 14. $41 \overline{)4223}$ | 15. $71 \overline{)0.0}$ | 16. $6.2 \overline{)12.4}$ | 17. $1 \overline{)1765}$ |
| 18. $23 \overline{)437}$ | 19. $64 \overline{)51\,264}$ | 20. $0 \overline{)17\,945}$ | 21. $1 \overline{)17\,956}$ | 22. $0 \overline{)895}$ |

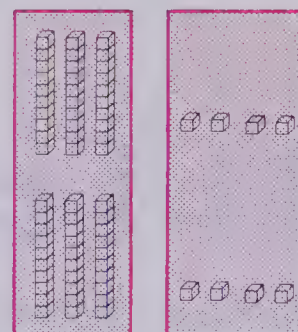
- Max had 54.9 mm of silver wire.
He cut it into 9 equal pieces for jewellery.
How long is each piece?
- Henrietta worked in the garden 210 min altogether.
How many hours did she work?
- ★ The distance around Jim's bicycle wheel is 210 cm.
Jim rode his bicycle 630 m.
How many times did the wheel turn?



The Distributive Property



$$\begin{aligned} &2 \text{ sets of } (30 + 4) \\ &2 \times (30 + 4) \\ &2 \times 34 \\ &68 \end{aligned}$$



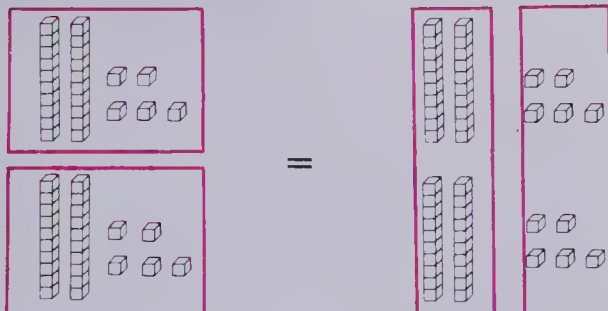
$$\begin{aligned} &2 \text{ sets of } 30 + 2 \text{ sets of } 4 \\ &(2 \times 30) + (2 \times 4) \\ &60 + 8 \\ &68 \end{aligned}$$

$$2 \times (30 + 4) = (2 \times 30) + (2 \times 4)$$

Exercises

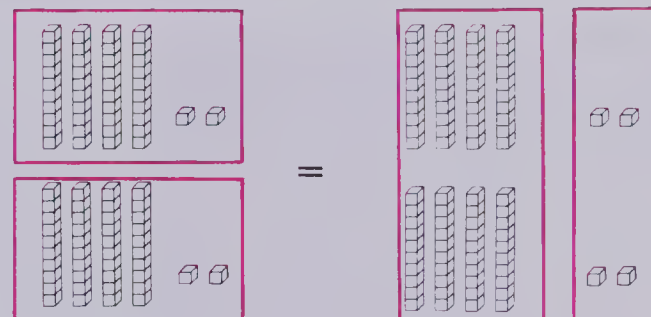
Complete.

1.



$$\begin{aligned} \blacksquare \times (\blacksquare + \blacksquare) &= (\blacksquare \times \blacksquare) + (\blacksquare \times \blacksquare) \\ \blacksquare \times \blacksquare &= \blacksquare + \blacksquare \\ \blacksquare &= \blacksquare \end{aligned}$$

2.



$$\begin{aligned} \blacksquare \times (\blacksquare + \blacksquare) &= (\blacksquare \times \blacksquare) + (\blacksquare \times \blacksquare) \\ \blacksquare \times \blacksquare &= \blacksquare + \blacksquare \\ \blacksquare &= \blacksquare \end{aligned}$$

$$\begin{aligned} 3. \quad 3 \times 12 &= 3 \times (10 + \blacksquare) \\ &= (3 \times \blacksquare) + (3 \times \blacksquare) \\ &= \blacksquare + \blacksquare \\ &= \blacksquare \end{aligned}$$

$$\begin{aligned} 4. \quad 4 \times 23 &= 4 \times (\blacksquare + \blacksquare) \\ &= (4 \times \blacksquare) + (4 \times \blacksquare) \\ &= \blacksquare + \blacksquare \\ &= \blacksquare \end{aligned}$$

5. 5×26

6. 7×19

7. 9×36

8. 6×43

9. 8×96

10. 4×412

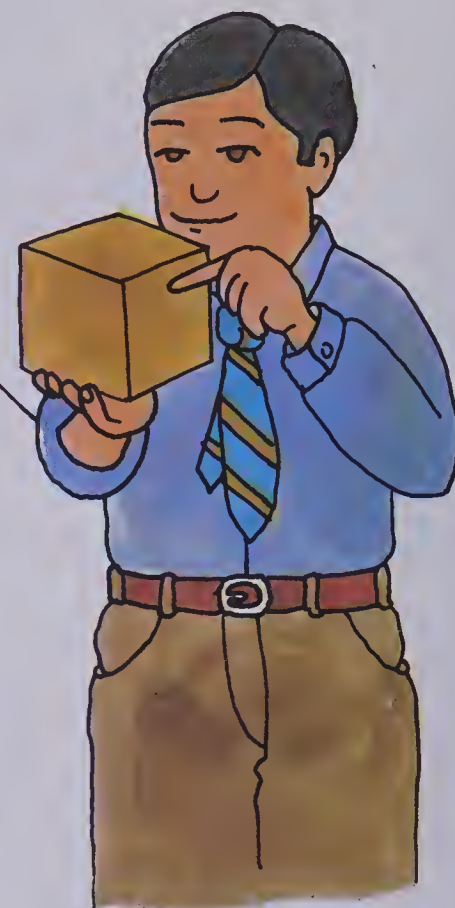
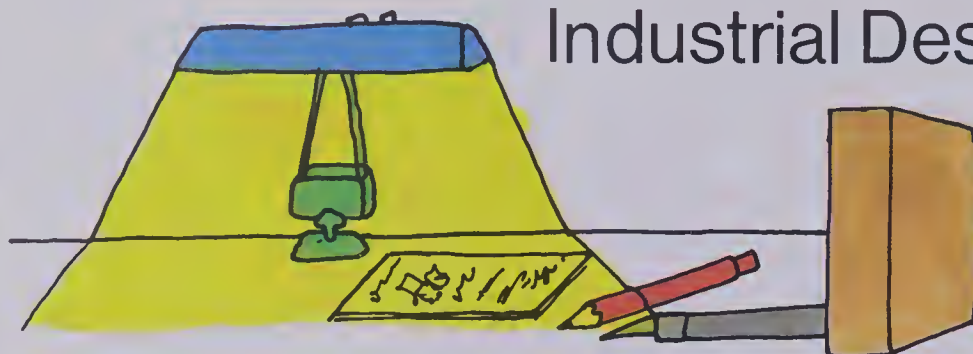
11. 8×109

12. 7×209

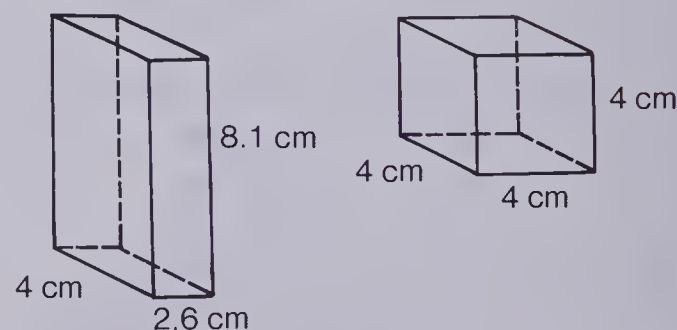
13. 8×620

14. 6×350

Industrial Designer

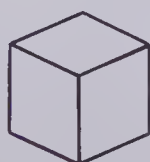


- Ms. Gomez is designing a carton to hold 10 seashells in 2 rows. The largest shell takes a rectangular space 6 cm by 4 cm. What are two sizes of the carton Ms. Gomez can make to hold the shells?
- Mr. Quong is designing a package for soap. If he uses boxes shaped like a cube, each package costs 18¢. If he uses rectangular solid boxes, each package costs 22¢. Mr. Quong recommended the cube. How much would Mr. Quong save his customer who wants 2000 boxes?
- Mrs. Niblak designs clock faces. She likes the hexagonal (six-sided) face better than the square face. Each hexagonal face costs \$1.33 while each square face costs \$0.86. How much extra would the hexagonal face cost in manufacturing 5000 clocks?
- Mr. Erickson is designing a package for a new revolutionary product. Which box has the larger volume?



- Name some products that would sell well when sold in each shape.

Cube



Hexagonal prism



Cylinder



Egg shape



Make Your Own Problems

For each set of statements write one problem.

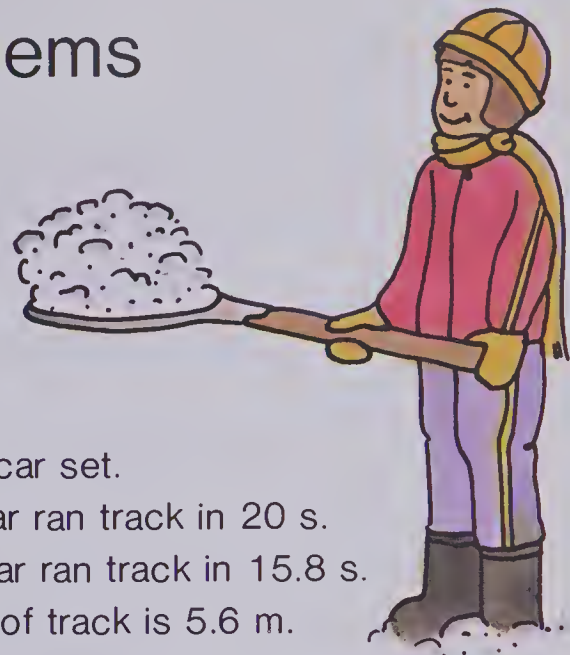
Write the problem on a card.

Solve your problem.

Write your answer on the reverse side of the card.

Exchange cards with classmates.

Solve 5 of their problems.



1. In Manitoba in one year 400 000 000 bottles and cans were recycled.
Average price paid per container is 5¢.

3. A rope is to be cut into skipping ropes.
Length of rope is 18.6 m.
There are 6 children.

5. 12 cm of snow on Saturday.
3 cm of snow fell each day Sunday through Wednesday.
Total snowfall for month was 62 cm.

2. Speed car set.
Red Star ran track in 20 s.
Blue Star ran track in 15.8 s.
Length of track is 5.6 m.
4. A tanker truck has 18 wheels.
There are 12 trucks.
Each truck needs 3 new tires.
Each tire costs \$252.50.

Tune Up

Calculate.

1. $3 + 4 + 7 + 9 + 16 + 25$
2. $17 + 6 + 7 + 4 + 19 + 22$
3. $371 + 456 + 78 + 5 + 777$
4. $5678 - 2999$
5. $700\,008 - 499\,999$
6. $7\,888\,666 - 1\,999\,999$
7. 47×8
8. 631×8
9. 9214×75
10. 6303×391
11. $6 \overline{)158}$
12. $7 \overline{)395}$
13. $9 \overline{)1845}$
14. $22 \overline{)792}$

BRAINTICKLER

It is said that Euclid gave this problem to his class in Alexandria about 280 B.C.:

A mule and a donkey were loaded down with wheat on their way to market. The mule said to the donkey, "If you give me 1 unit of wheat I will be carrying twice as much as you. If I gave you 1 unit, we would both have equal masses." How many units of wheat was each carrying?

Divisibility

Grandma Thatchett wanted to divide 18 chocolate chip cookies among her 3 grandchildren. She gave each of them 6 cookies. There were no cookies left.

$$\begin{array}{r} 6 \\ 3 \overline{) 18} \\ \underline{18} \\ 0 \end{array}$$

18 is divisible by 3.

0 ← No remainder

19 is not divisible by 3.

$$\begin{array}{r} 6 \\ 3 \overline{) 19} \\ \underline{18} \\ 1 \end{array}$$

1 ← Remainder

If there is *no* remainder, the first number is **divisible** by the second number.

Exercises

1. Divide to determine which of the following are divisible by 2.

24 35 72 126 363 757 800

2. Divide to determine which of the following are divisible by 3.

33 61 73 156 270 692 927

3. Divide to determine which of the following are divisible by 4.

64 39 124 314 508 1720 1913

4. Divide to determine which are divisible by 5.

45 63 515 680 1751 1975 12 350

5. Divide to determine which are divisible by 9.

56 63 157 927 1512 3411 76 545

6. Divide to determine which are divisible by 10.

70 290 403 905 1600 2580 96 400



Activity

Work in pairs. Take turns choosing a number and giving it to your partner to determine if its divisible by one of 2, 3, 4, 5, 9, or 10. (You must be able to tell if your partner is correct.)

One point for each correct answer. The player with the most points after 10 plays wins.



Divisibility by 2 and 4



Even Steven

Even

10

42

74

36

298

$$\begin{array}{r} 5 \\ 2 \overline{) 10} \\ \underline{10} \\ 0 \end{array}$$

$$\begin{array}{r} 149 \\ 2 \overline{) 298} \\ \underline{2} \\ 09 \\ \underline{8} \\ 18 \\ \underline{18} \\ 0 \end{array}$$

Odd Maude

Odd

21

53

65

87

39

$$\begin{array}{r} 5 \\ 4 \overline{) 21} \\ \underline{20} \\ 1 \end{array}$$

Even numbers are divisible by 2.

The one's digit is either 0, 2, 4, 6, or 8.

$$\begin{array}{r} 54 \\ 4 \overline{) 216} \\ \underline{20} \\ 16 \\ \underline{16} \\ 0 \end{array}$$

$$\begin{array}{r} 127 \\ 4 \overline{) 508} \\ \underline{4} \\ 10 \\ \underline{8} \\ 28 \\ \underline{28} \\ 0 \end{array}$$

$$\begin{array}{r} 431 \\ 4 \overline{) 1724} \\ \underline{16} \\ 12 \\ \underline{12} \\ 04 \\ \underline{4} \\ 0 \end{array}$$

$$\begin{array}{r} 112 \\ 4 \overline{) 448} \\ \underline{4} \\ 04 \\ \underline{4} \\ 08 \\ \underline{8} \\ 0 \end{array}$$

$$\begin{array}{r} 428 \\ 4 \overline{) 1712} \\ \underline{16} \\ 11 \\ \underline{8} \\ 32 \\ \underline{32} \\ 0 \end{array}$$

$$\begin{array}{r} 1250 \\ 4 \overline{) 5000} \\ \underline{4} \\ 10 \\ \underline{8} \\ 20 \\ \underline{20} \\ 00 \\ \underline{0} \\ 0 \end{array}$$

The numbers 216, 508, 1724, 448, 1712, and 5000 are divisible by 4.

The last two digits in each number are divisible by 4.

A number is divisible by 4 if the last 2 digits are divisible by 4.

Exercises

1. List each number as even or odd.

8, 9, 18, 29, 61, 84, 137, 840, 945, 348, 952, 156, 3599, 4614, 6407, 6532, 6843.

Even	Odd
8	9

2. Which numbers are divisible by 2?
1260, 7183, 6666, 855, 2768, 9969.

3. Count by 4's from 480 to 512.
Are the last two digits in each number divisible by 4?
Are all the numbers divisible by 4?

Divisibility by 5 and 10



1. Copy and complete. Examine the one's digit in each.

$$\underline{5} \div 5 = 1$$

$$\underline{10} \div 5 = 2$$

$$\underline{15} \div 5 = 3$$

$$\underline{20} \div 5 = \blacksquare$$

$$\underline{25} \div 5 = \blacksquare$$

$$\underline{30} \div 5 = \blacksquare$$

$$\underline{35} \div 5 = \blacksquare$$

$$\underline{40} \div 5 = \blacksquare$$

$$\underline{45} \div 5 = \blacksquare$$

$$\underline{50} \div 5 = \blacksquare$$

2. Copy and complete.

A number is divisible by 5 if the one's digit is \blacksquare or \blacksquare .

3. Copy and complete. Examine the one's digit in each.

$$\underline{10} \div 10 = 1$$

$$\underline{20} \div 10 = 2$$

$$\underline{30} \div 10 = \blacksquare$$

$$\underline{40} \div 10 = \blacksquare$$

$$\underline{50} \div 10 = \blacksquare$$

$$\underline{60} \div 10 = \blacksquare$$

$$\underline{70} \div 10 = \blacksquare$$

$$\underline{80} \div 10 = \blacksquare$$

$$\underline{90} \div 10 = \blacksquare$$

$$\underline{100} \div 10 = \blacksquare$$

4. Copy and complete.

A number is divisible by 10 if the one's digit is \blacksquare .

5. Copy these numbers. Draw a circle around each number divisible by 5.

16, 25, 30, 24, 87, 115, 2, 70, 221, 175, 360, 478.

6. Copy these numbers. Draw a square around each number divisible by 10.

60, 32, 100, 213, 400, 680, 39, 518, 950, 76, 340, 1000.

7. Write three numbers greater than 100 that are divisible by 5.

8. Write three numbers greater than 200 that are divisible by 10.

Divisibility by 3 and 9

$$\begin{array}{r}
 849 \\
 3 \overline{) 2547} \rightarrow 2547 \rightarrow 2 + 5 + 4 + 7 = 18 \\
 \underline{24} \\
 14 \\
 \underline{12} \\
 27 \\
 \underline{27} \\
 0
 \end{array}$$

Add the digits.
18 is divisible by 3.
2547 is divisible by 3.

$$\begin{array}{r}
 5282 \\
 9 \overline{) 47538} \rightarrow 47538 \rightarrow 4 + 7 + 5 + 3 + 8 = 27 \\
 \underline{45} \\
 25 \\
 \underline{18} \\
 73 \\
 \underline{72} \\
 18 \\
 \underline{18} \\
 0
 \end{array}$$

Add the digits.
27 is divisible by 9.
47 538 is divisible by 9.

Exercises

- Count by 3's from 93 to 129. Write the numbers.
 - Add the digits in each number. Is the sum in each divisible by 3?

Add the digits.

 $93 \rightarrow 9 + 3 = 12$ 12 is divisible by 3.
 $96 \rightarrow 9 + 6 = 15$ 15 is divisible by 3.
 - Is each number divisible by 3?
 - Write a rule for finding numbers divisible by 3.
- Which of the following are divisible by 3?

234 331 4563 453 912 415 553
- Count by 9's from 81 to 162. Write the numbers.
 - Add the digits in each number. Is the sum in each divisible by 9?

Add the digits.

 $81 \rightarrow 8 + 1 = 9$ 9 is divisible by 9.
 $90 \rightarrow 9 + 0 = 9$ 9 is divisible by 9.
 - Is each number divisible by 9?
 - Write a rule for finding numbers divisible by 9.
- Which of these numbers are divisible by 9?

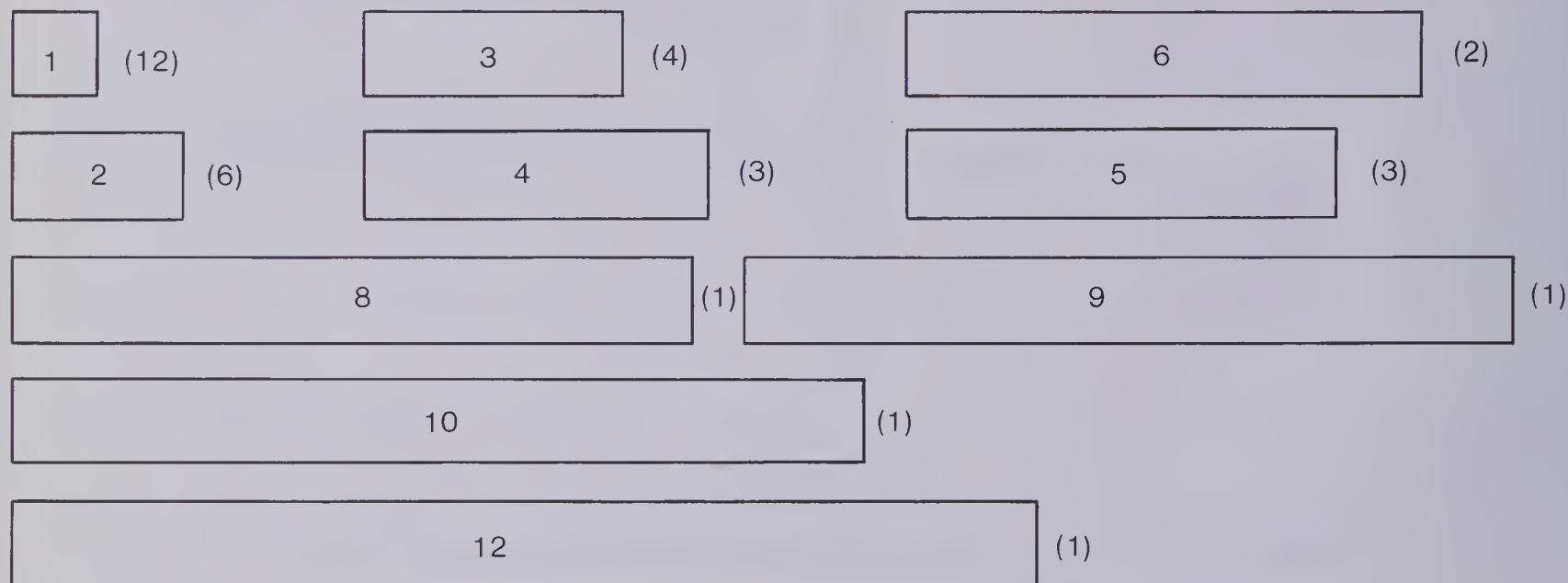
56 63 157 927 1512 76 545

Factors

Make bars from cardboard. Label as shown.

The label tells the length in centimetres of each bar.

The number in brackets tells the number of those bars to make.



- Place an 8-bar on your desk.
Cover it exactly using one kind of bar.
One way is to use two 4-bars.

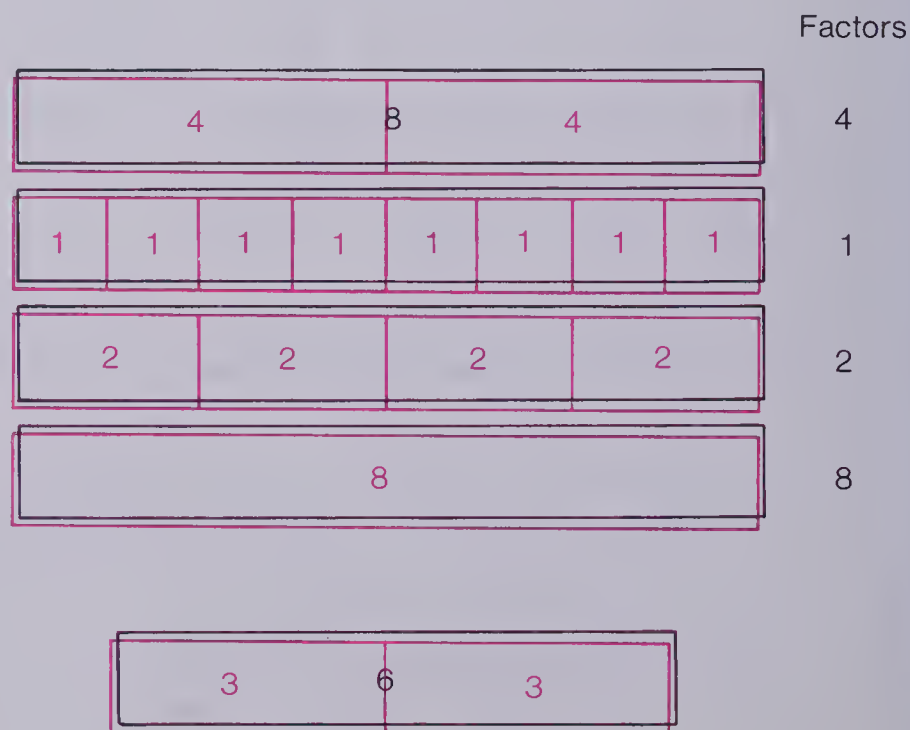
4 is a **factor** of 8.

Are there other ways?

Name the *factors* of 8.

- Place a 6-bar on your desk.
Cover it exactly using one kind of bar.
Discover all the bars that will work.
Name the *factors* of 6.

- Repeat for a 12-bar.
- Repeat for a 10-bar.



The Birthday Party

At his birthday party, Freddie and two friends ate 5 hot dogs each.
How many hot dogs did the 3 boys eat altogether?

$$\begin{array}{ccccccc} 3 & \times & 5 & = & 15 \\ \text{Factor} & & \text{Factor} & & \text{Product} \end{array}$$



Exercises

1. Write the products of these factors.

- | | | | |
|---------------------------------|---------------------------------|---------------------------------|-----------------------------------|
| (a) $8 \times 9 = \blacksquare$ | (b) $3 \times 7 = \blacksquare$ | (c) $4 \times 6 = \blacksquare$ | (d) $10 \times 10 = \blacksquare$ |
| (e) $6 \times 8 = \blacksquare$ | (f) $9 \times 7 = \blacksquare$ | (g) $3 \times 6 = \blacksquare$ | (h) $8 \times 8 = \blacksquare$ |

2. Write the missing factors.

- | | | | |
|----------------------------------|----------------------------------|-----------------------------------|----------------------------------|
| (a) $2 \times \blacksquare = 18$ | (b) $4 \times \blacksquare = 36$ | (c) $\blacksquare \times 10 = 50$ | (d) $9 \times \blacksquare = 81$ |
| (e) $5 \times \blacksquare = 45$ | (f) $8 \times \blacksquare = 56$ | (g) $\blacksquare \times 6 = 12$ | (h) $\blacksquare \times 9 = 54$ |

3. Copy and complete.

$$1 \times \blacksquare = 24 \quad 2 \times \blacksquare = 24 \quad 3 \times \blacksquare = 24 \quad 4 \times \blacksquare = 24$$

All the factors of 24 are 1, \blacksquare , 2, \blacksquare , 3, \blacksquare , 4, \blacksquare .

All the factors of 24 listed from the smallest to the largest are 1, 2, 3, 4, 6, \blacksquare , \blacksquare , \blacksquare .

4. Copy and complete.

$$1 \times \blacksquare = 18 \quad 2 \times \blacksquare = 18 \quad 3 \times \blacksquare = 18$$

All the factors of 18 are 1, \blacksquare , 2, \blacksquare , 3, \blacksquare .

All the factors of 18 listed from the smallest to the largest are 1, 2, 3, \blacksquare , \blacksquare , \blacksquare .

5. Copy and complete.

$$1 \times \blacksquare = 72 \quad 2 \times \blacksquare = 72 \quad 3 \times \blacksquare = 72 \quad 4 \times \blacksquare = 72 \quad 6 \times \blacksquare = 72 \quad 8 \times \blacksquare = 72$$

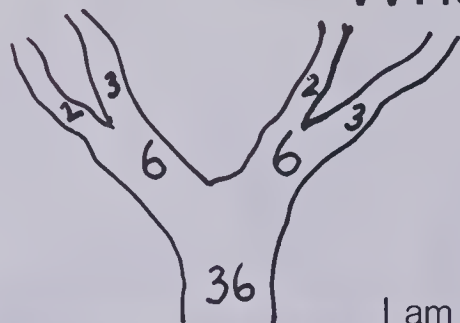
Write all the factors of 72.

Write all the factors of 72 in order smallest to largest.

★ 6. What do you notice about the factor 1?

What am I?

I am a tree.
I have lines.
I have numbers.
What am I?

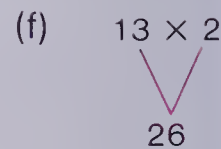
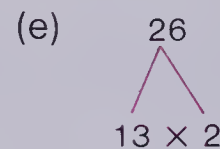
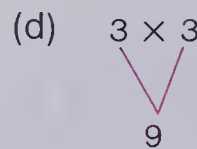
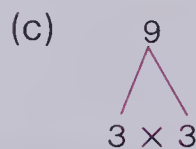
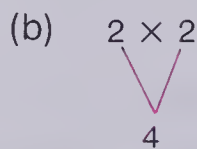
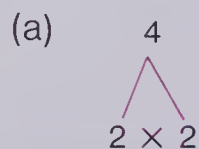


I am a **factor tree**.

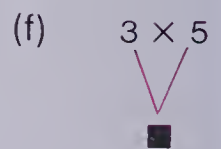
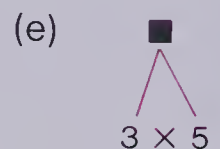
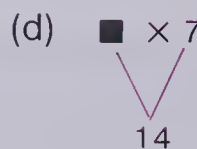
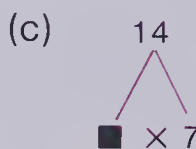
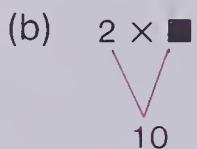
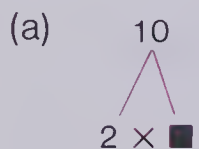


Exercises

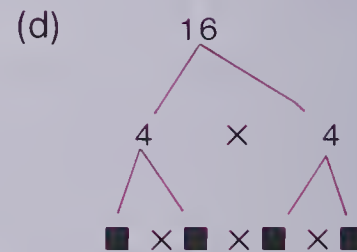
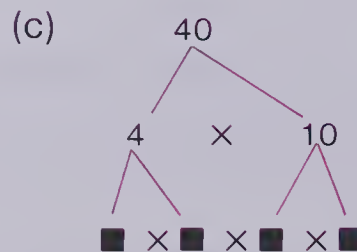
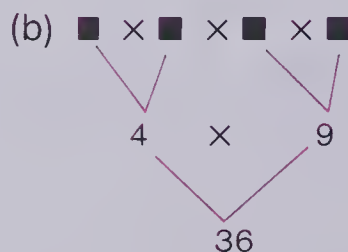
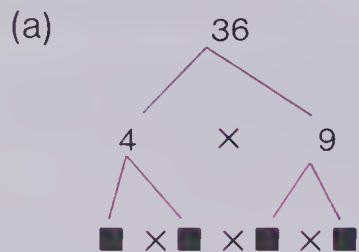
1. Copy these factor trees. Circle the product. Draw boxes around the factors.



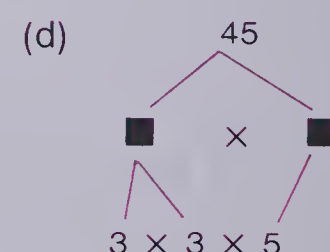
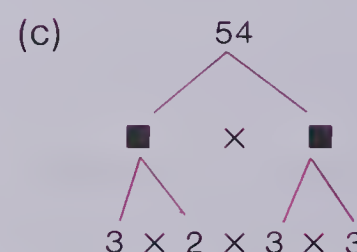
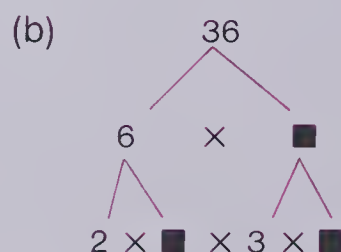
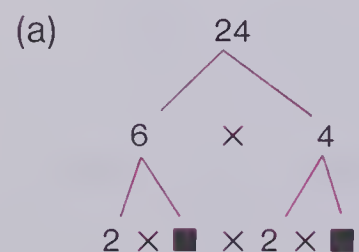
2. Copy and complete these factor trees.



3. Copy and complete.



4. Copy and complete.



5. Draw a factor tree for each:

(a) 45

(b) 64


(c) 72


★ (d) 187

★ (e) 221

Composite and Prime Numbers


 $1 \times 12 = 12$


 $2 \times 6 = 12$

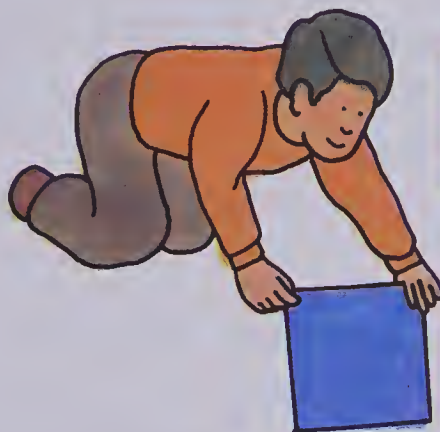

 $3 \times 4 = 12$

All the factors of 12 are

1, 2, 3, 4, 6, 12.

12 has more than 2 factors.

12 is a **composite number**.

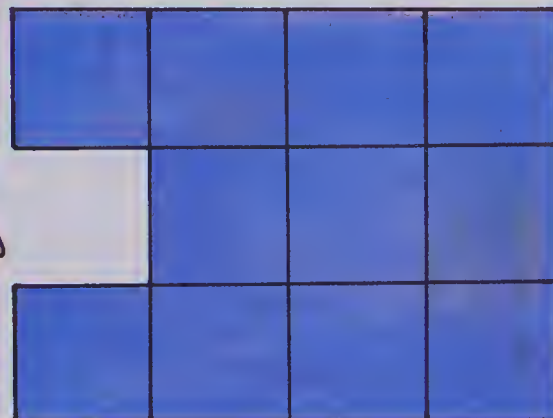



 $1 \times 5 = 5$

All the factors of 5 are 1, 5.

5 is a **prime number**.

5 has exactly 2 factors.



Exercises

1. (a) Use 7 squares. How many different rectangles can you make?
 (b) Repeat for 3, 11, 13, 17, and 19 squares.
 (c) What kind of numbers are 3, 11, 13, 17, and 19? Why?
2. (a) Use 6 squares. How many different rectangles can you make?
 (b) Repeat for 4, 8, 9, 10, 14, and 15 squares.
 (c) What kind of numbers are they? Why?

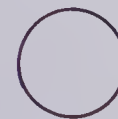
3. Draw 2 large circles and label one *prime* and one *composite*.

Write each of the following numbers in the correct circle.

2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25,
 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40.

Prime

Composite



★ 4. Why is 1 not a prime number?

★ 5. Why is 1 not a composite number?

Composite and Prime Numbers

Chrissie Composite



Remember!
Composite
numbers have
more than
2 factors.

$$8 = 2 \times 4$$

$$8 = 1 \times 8$$

Percy Prime



Remember!
Prime numbers
have exactly
2 factors.

$$7 = 1 \times 7$$

Exercises

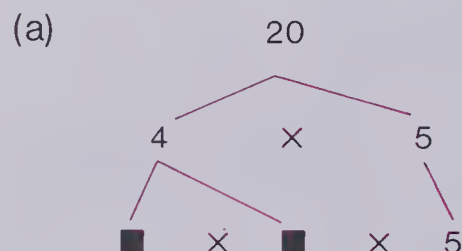
1. Make a chart as shown for these numbers:

12, 13, 17, 22, 23, 29, 33, 37, 40, 48, 51, 56, 63, 70.

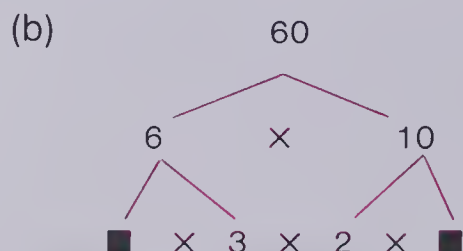
	Number	Factors	Prime	Composite
(a)	12	1, 2, 3, 4, 6, 12		✓
(b)	13	1, 13	✓	
(c)	17			

2. Numbers can be expressed as products of their prime factors.

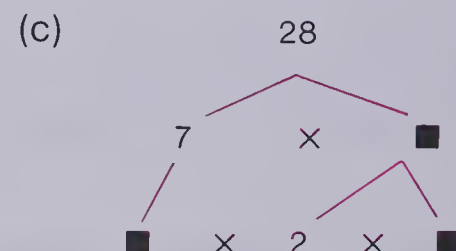
Copy and complete each.



$$\boxed{[] \times [] \times 5 = 20}$$



$$\boxed{[] \times 3 \times 2 \times [] = 60}$$



$$\boxed{[] \times 2 \times [] = 28}$$

3. List, in order from smallest to largest, the prime factors for:

(a) 20 → [], [], 5

(b) 60 → 2, [], 3, []

(c) 28 →

4. Write the following as products of their prime factors:

(a) 24

(b) 39

(c) 23

(d) 45

(e) 31

(f) 125

(g) 231

The Sieve of Eratosthenes

Eratosthenes (say: “er a TOS the nēs”) was a Greek mathematician or math expert who lived about 2200 years ago. He invented a way of showing prime numbers called the Sieve of Eratosthenes.



Copy on graph paper.

	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1. Do not cross out 2, but cross out all multiples of 2.
2. Do not cross out 3, but cross out all multiples of 3.
3. Do not cross out 5, but cross out all multiples of 5.
4. Do not cross out 7, but cross out all multiples of 7.
5. The numbers that are crossed out are ■ numbers.
6. The numbers that are not crossed out are ■ numbers.

Common Factors

Jeff listed the factors of 24.

Number	Factors								
24	1	2	3	4	6	8	12	24	

24	1×24
	2×12
	3×8
	4×6

36	1×36
	2×18
	3×12
	4×9
	6×6

Sandra listed the factors of 36.

Number	Factors									
36	1	2	3	4	6	9	12	18	36	

Some numbers are in **both** lists.

These are **common factors** and they are: 1, 2, 3, 4, 6, and 12.

Exercises

1. (a) List the factors of 6. (b) List the factors of 8.
(c) Draw \triangle 's around the common factors of 6 and 8.
2. (a) List the factors of 9. (b) List the factors of 15.
(c) Draw squares around the common factors of 9 and 15.
3. (a) List the factors of 12. (b) List the factors of 18.
(c) Draw circles around the common factors of 12 and 18.
4. (a) List the factors of 16. (b) List the factors of 24.
(c) List the common factors of 16 and 24.

Activity

Use a set of cards numbered 1 to 50.

Each player draws a card from the pile.

All players write the factors for the drawn number.

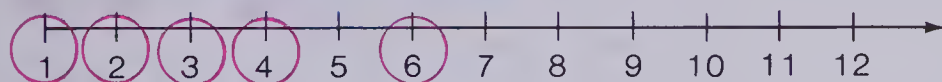
The player with the most correct factors scores a point for each factor.

The winner is the player with the most points after 10 plays.



Pensive Priscilla's Problem

Priscilla puzzled and she pondered
But this problem really racked her.
For the numbers 12 and 20
What is the greatest common factor?



The common factors of 12 and 20 are 1, 2, and 4.

The **greatest common factor** is 4.

Exercises

Copy and complete.

	Numbers	Factors	Common Factors	Greatest Common Factor
(a)	6	① 2, ③ 6	1, 3	3
	9	① ③ 9		
(b)	8			
	24			
(c)	14			
	20			
(d)	10			
	15			
(e)	36			
	48			

Multiples

Use the bars from the Factors Activity on Page 210.

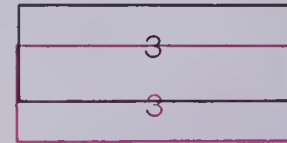
Multiples

1. (a) Place a 3-bar on the desk.

Which one bar will cover this bar exactly?

The only bar is another 3-bar.

3 is a multiple of 3.



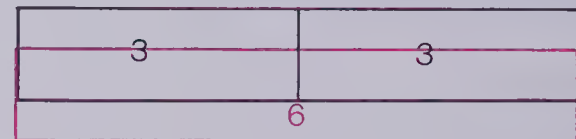
3

- (b) Place two 3-bars end to end on the desk.

Which one bar will cover this exactly?

The only bar is the 6-bar.

6 is a multiple of 3.



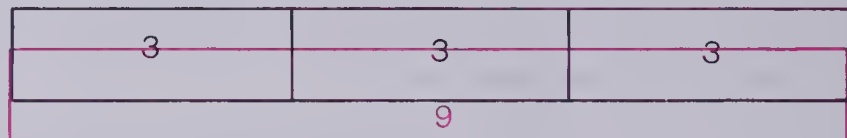
6

- (c) Place three 3-bars end to end on the desk.

Which one bar will cover this exactly?

9 is a multiple of 3.

- (d) Name other multiples of 3.



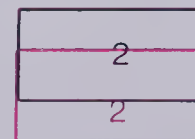
9

Multiples

2. Use the 2-bars.

Repeat Steps (a) to (d) above.

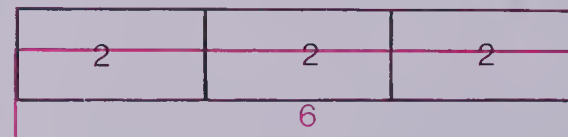
Name multiples of 2.



2



4



6



8

3. Use 4-bars.

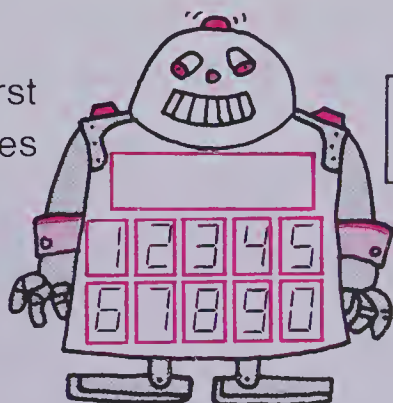
Repeat Steps (a) to (d).

Name multiples of 4.

Omega-Y, The Multiple Maker

Command

Print the first five multiples of 2.



Display

2, 4, 6,
8, 10

Command

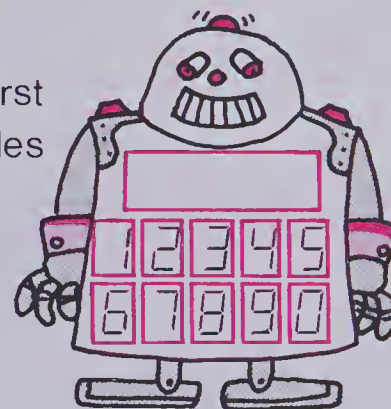
Print the next five multiples of 2.

Display

■, ■, ■,
■, ■

Command

Print the first five multiples of 3.



Display

3, 6, 9,
12, 15

Command

Print the next five multiples of 3.

Display

■, ■, ■,
■, ■

Exercises

1. Copy and complete. Write the missing multiples.

(a) 4, 8, ■, 16, ■, 24, ■, 32, ■.

(b) 5, ■, 15, ■, 25, ■, 35, ■, 45, ■.

(c) 10, ■, 30, 40, ■, ■, 70, ■, ■, 100.

2. Write the multiples of 6 up to 60.

3. Write the multiples of 7 up to 56.

4. Write the multiples of 8 up to 64.

5. Write any four multiples of 9.

6. Write the multiples of 3 (up to 30) which are even numbers.

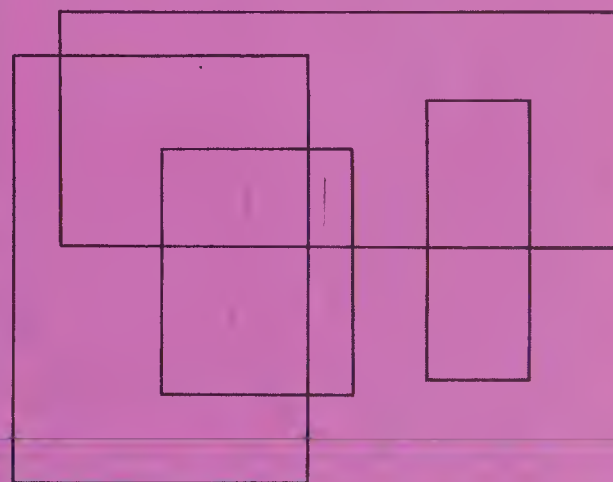
7. Write the first five multiples of 13.

★ 8. Choose any 2-digit number larger than 20. Write the first five multiples of your number.

★ 9. Choose any 3-digit number. Write the first five multiples of your number.

BRAINTICKLER

How many rectangles?



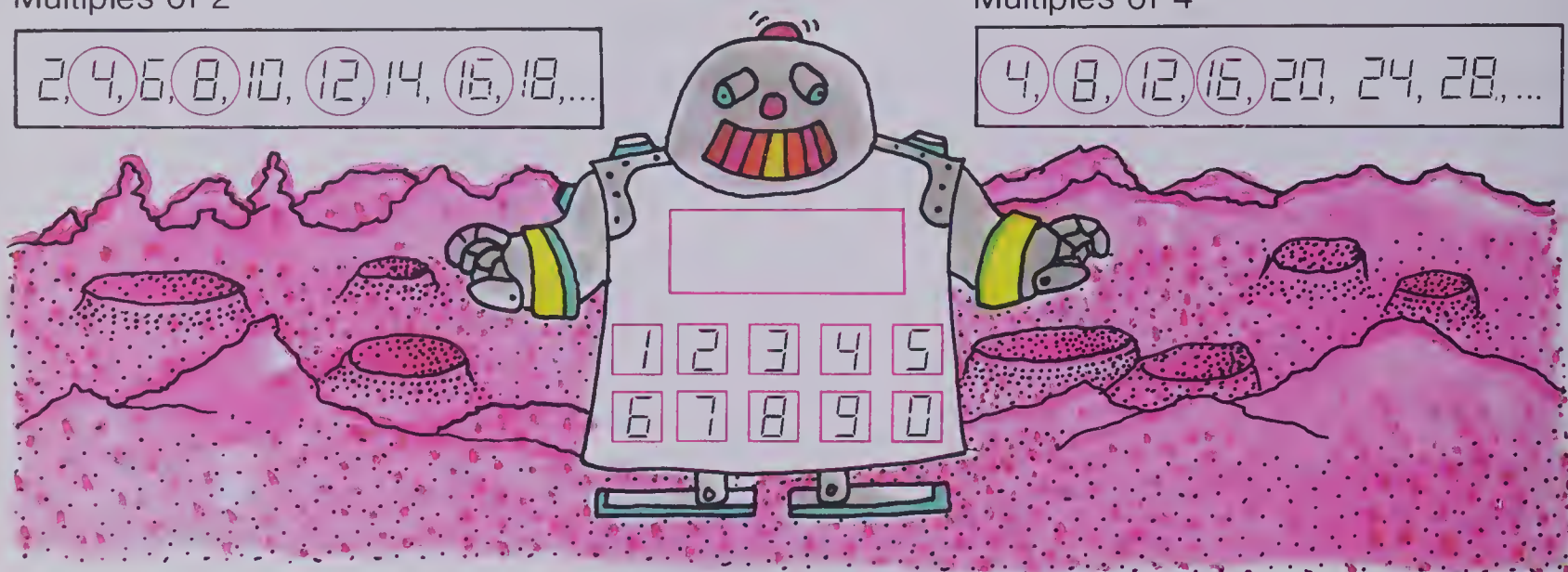
Common Multiples

Multiples of 2

2, 4, 6, 8, 10, 12, 14, 16, 18, ...

Multiples of 4

4, 8, 12, 16, 20, 24, 28, ...



Omega-Y shows some common multiples of 2 and 4.

4, 8, 12, 16.

Exercises

1. (a) Write the multiples of 3 up to 36.
(b) Write the multiples of 4 up to 36.
(c) Circle the common multiples.
2. (a) Write the multiples of 5 up to 60.
(b) Write the multiples of 6 up to 60.
(c) Circle the common multiples.
3. (a) Write the multiples of 4 up to 60.
(b) Write the multiples of 10 up to 60.
(c) Circle the common multiples.
4. (a) Write the multiples of 6 up to 48.
(b) Write the multiples of 8 up to 48.
(c) Circle the common multiples.
5. Copy and complete. Write the missing multiples of 2 and 3.
2, 4, ■, 8, 10, ■, 14, 16, ■, 20, 22, ■.
3, ■, 9, ■, 15, ■, 21, ■, 27, 30.
List the common multiples of 2 and 3.
6. Write the first three common multiples of:
(a) 2 and 3 (b) 5 and 10 (c) 2 and 4
(d) 3 and 4 (e) 4 and 5 (f) 3 and 6.

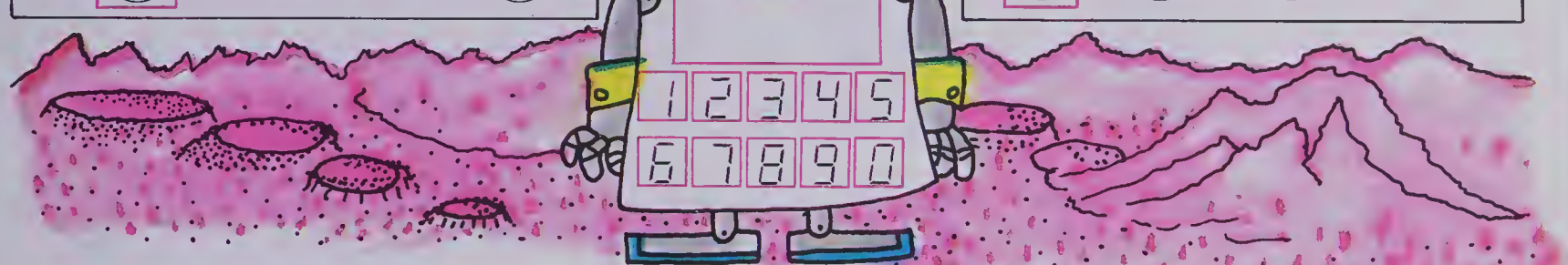
Least Common Multiple

Multiples of 2

2, 4, 6, 8, 10, 12, 14, 16, 18, ...

Multiples of 3

3, 6, 9, 12, 15, 18, 21, 24, ...



Omega-Y shows some common multiples of 2 and 3.

6, 12, 18.

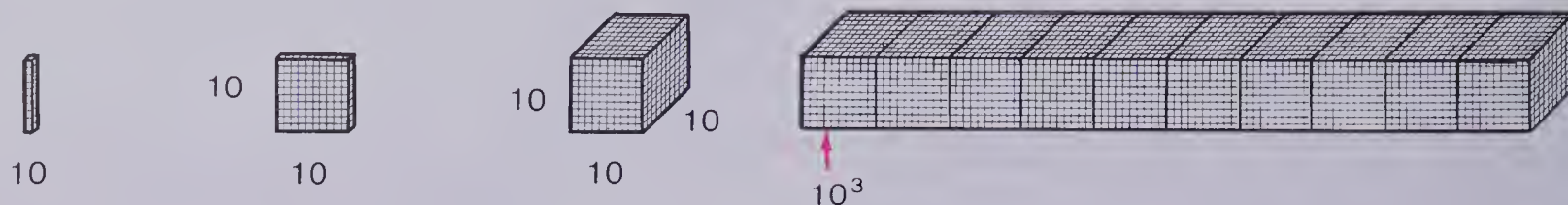
The **least** (smallest) **common multiple** is 6.

Exercises

Copy and complete.

	Numbers	Multiples	Common Multiples	Least Common Multiple
(a)	3	3, 6, 9, 12, 15, 18, 21, 24, 27, 30	15, 30	15
	5	5, 10, 15, 20, 25, 30, 35, 40, 45, 50		
(b)	4	■, ■, ■, ■, ■, ■, ■, ■, ■, 40		
	6	■, ■, ■, ■, ■, ■, ■, ■, ■, 60		
(c)	2	■, ■, ■, ■, ■, ■, ■, ■, ■, 20		
	3	■, ■, ■, ■, ■, ■, ■, ■, ■, 30		
(d)	4	■, ■, ■, ■, ■, ■, ■, ■, ■, 40		
	8	■, ■, ■, ■, ■, ■, ■, ■, ■, 80		
(e)	5	■, ■, ■, ■, ■, ■, ■, ■, ■, 50		
	10	■, ■, ■, ■, ■, ■, ■, ■, ■, 100		
(f)	3	■, ■, ■, ■, ■, ■, ■, ■, ■, 30		
	9	■, ■, ■, ■, ■, ■, ■, ■, ■, 90		

Using Exponents



$$10 = 10 = 10^1$$

$$10 \times 10 = 100 = 10^2$$

$$10 \times 10 \times 10 = 1000 = 10^3$$

$$10 \times 10 \times 10 \times 10 = 10\,000 = 10^4$$

$$10^2$$

Exponent

Base

We say: "ten to the exponent two".

Exercises

1. Read, then write.

- (a) Ten to the exponent two.
(c) Ten to the exponent four.

(b) Ten to the exponent three.

2. Copy and complete.

- (a) $\blacksquare \times \blacksquare = 10^2$
(c) $\blacksquare \times \blacksquare \times \blacksquare \times \blacksquare = 10^4$

(b) $\blacksquare \times \blacksquare \times \blacksquare = 10^3$

3. Write each number in the exponent form.

- (a) $100 = \blacksquare$ (b) $1000 = \blacksquare$ (c) $10\,000 = \blacksquare$

★ 4. We can multiply powers of 10 by ones.

Copy and complete each.

- (a) 4×10^1 means 40
 4×10^2 means 400
 4×10^3 means \blacksquare

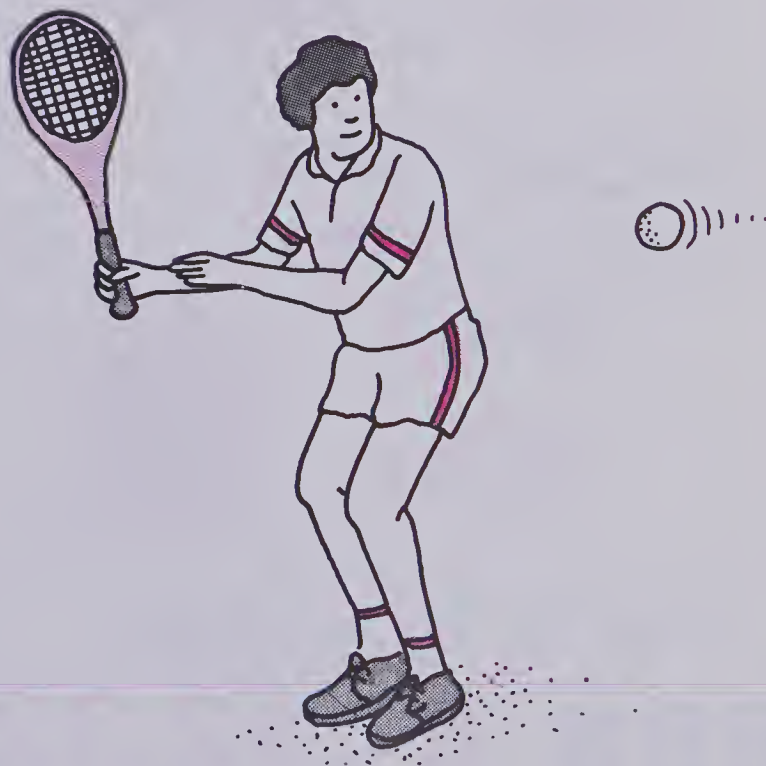
- (c) 6×10^1 means \blacksquare
 6×10^2 means \blacksquare
 $\blacksquare \times \blacksquare$ means 6000

- (b) 3×10^1 means \blacksquare
 $\blacksquare \times \blacksquare$ means 300
 $\blacksquare \times \blacksquare$ means 3000

- (d) $\blacksquare \times \blacksquare$ means 90
 $\blacksquare \times \blacksquare$ means 900
 $\blacksquare \times \blacksquare$ means 9000

Practice Makes Perfect

1. Which numbers between 4 and 30 are divisible by 6?
2. Copy and complete.
A number is divisible by 10 if the one's digit is ■ .
A number is divisible by 5 if the one's digit is ■ or ■ .
3. Write all the factors of each.
(a) 32 (b) 21 (c) 54 (d) 26 (e) 40
4. Write the following numbers as products of their prime factors. (Draw factor trees.)
(a) 63 (b) 88 (c) 16 (d) 49 (e) 54
5. Write these numbers. Circle the composite numbers.
52, 73, 4, 55, 106, 7, 48, 129, 210, 11, 124, 19, 714, 515, 416, 31.
6. (a) Write the factors of 6.
(b) Write the factors of 9.
(c) Write the common factors.
(d) Write the greatest common factor.
7. (a) Write the multiples of 4 up to 60.
(b) Write the multiples of 6 up to 60.
(c) Write the common multiples.
(d) Write the least common multiple.
8. Write each number in the exponent form.
(a) 10 (b) 1000
(c) 10 000 ★ (d) 100 000



The Food Mart

REGULAR
OR
DIET
POPSI-COLA

39¢ plus 30¢ deposit

BEST BUY



LIGHT BULBS

6 for **\$1.38**



PERRY
PUDDING CUPS

Reg. Price \$1.27

99¢ each

BEST BUY

Produce of USA Canada No. 1 Grade

HEAD LETTUCE

Reg. Price 89¢



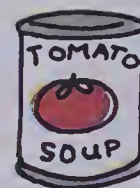
59¢

THOMSON'S
PURE APPLE
JUICE

69¢

HALF
PRICE

BRAMBLE'S
TOMATO
SOUP



Reg. Price 24¢ each

4 for **80¢**

BEST BUY

JUICE GLASSES



8 for **\$2.32**

Produce of Mexico Canada No. 1 Grade

GREEN PEPPERS

29¢ each



Read the advertisements for Food Mart “Super Specials”, then answer the questions.

1. (a) What is the sale price of 2 dozen cans of Bramble’s soup?
 (b) At the regular price, what would 2 dozen cans cost?
 (c) What do you save?
2. (a) What is the price of 1 juice glass?
 (b) What is the price of 6 juice glasses?
3. How many green peppers can you buy for \$1.75?
4. (a) How much do you save on 1 Perry Pudding Cup at the sale price?
 (b) How much will you save on 6 pudding cups?
 (c) If you buy 6 pudding cups and pay with a ten-dollar bill, how much change will you receive?
5. (a) What is the price of 9 cans of Thomson’s Pure Apple Juice?
 (b) At the regular price, what would 9 cans of apple juice cost?
 (c) How much do you save?
6. (a) What is the total cost of 1 bottle of Popsi-Cola (including deposit)?
 (b) What is the cost of 12 bottles?
- ★7. What is the price of 6 dozen light bulbs?

Chapter Test

1. Consider 3456. Tell if it is divisible by each of the following numbers.
 (a) 2 (b) 3 (c) 4 (d) 5 (e) 10
2. How do you recognize numbers that are divisible by
 (a) 3 (b) 4 (c) 5?
3. Which of these numbers are divisible by 9?
 (a) 18 (b) 104 (c) 27 (d) 324 (e) 558
4. Which of these are prime numbers? Which are composite numbers?
 (a) 7 (b) 12 (c) 19 (d) 22 (e) 27
5. Copy and complete.
 (a) $3 \times 48 = 3 \times (40 + \blacksquare)$
 $= (3 \times \blacksquare) + (3 \times \blacksquare)$
 $= \blacksquare + \blacksquare$
 $= \blacksquare$
 (b) $(16 + 17) + 33 = 16 + (\blacksquare + \blacksquare)$
 $= \blacksquare + \blacksquare$
 $= \blacksquare$
6. Write all factors for each of the following.
 (a) 15 (b) 18 (c) 35 (d) 100
7. Express the following as products of their prime factors.
 (a) 28 (b) 30 (c) 45 (d) 72
8. (a) Write the factors of 16. (b) Write the factors of 24.
9. Write the greatest common factor of 8 and 12.
10. Write the first 5 multiples of 12.
11. Write the least common multiple of 6 and 8.
12. Write the following numbers in exponent form.
 (a) 100 (b) 1000 (c) 10 000
13. Which are *true* statements?
 (a) $13 \times 29 = 29 \times 13$ (b) $4 - 14 = 14 - 4$ (c) $52 \div 3 = 3 \div 52$
 (d) $6 \times 0 = 6$ (e) $7 \div 0 = 0$ (f) $318 \times 1 = 318$

Cumulative Review

1. Write in words.

(a) 47.4

(b) 7 349 042

(c) 58 324

(d) 85.46

2. Find the sums and differences.

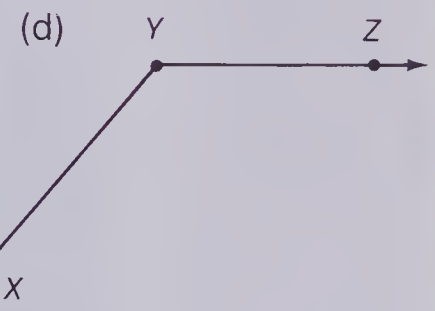
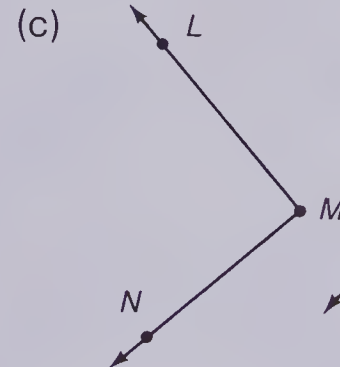
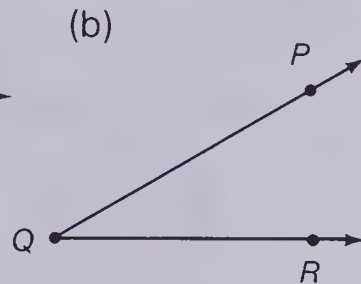
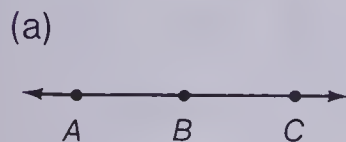
$$\begin{array}{r} 13\,299 \\ 3\,485 \\ 26\,041 \\ + 9\,175 \\ \hline \end{array}$$

$$\begin{array}{r} 27.63 \\ 48.05 \\ + 19.17 \\ \hline \end{array}$$

$$\begin{array}{r} 74\,325 \\ - 26\,091 \\ \hline \end{array}$$

$$\begin{array}{r} 9.58 \\ - 4.19 \\ \hline \end{array}$$

3. Name each angle as acute, obtuse, right, or straight angle.



4. Multiply.

$$\begin{array}{r} 76 \\ \times 23 \\ \hline \end{array}$$

$$\begin{array}{r} \$536.74 \\ \times \quad 6 \\ \hline \end{array}$$

$$\begin{array}{r} 85.04 \\ \times 0.9 \\ \hline \end{array}$$

$$\begin{array}{r} 447 \\ \times 325 \\ \hline \end{array}$$

5. Divide.

$$8 \overline{) 476}$$

$$18 \overline{) 3476}$$

$$40 \overline{) 320}$$

$$96 \overline{) 3264}$$

6. How many seconds are in 4 min?

7. Copy and complete.

(a) 1 dm = ■ cm

(b) 4 t = ■ kg

(c) 1 L = ■ mL

8. Solve.

(a) $N < 10$

(b) $8 > A$

(c) $32 - 25 > B$

Chapter 8

Fractions

Addition and Subtraction

Decimals

Ratio and Per Cent

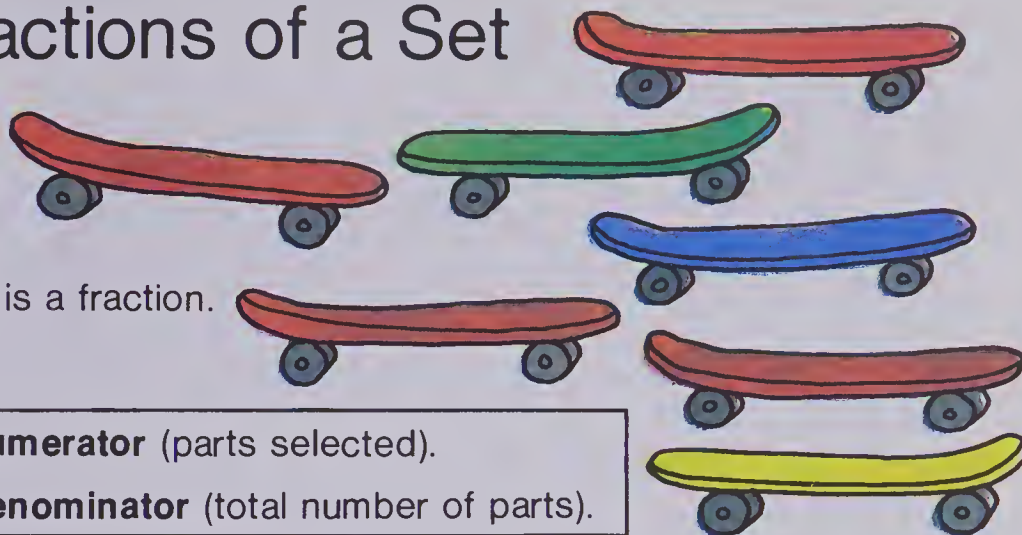


Fractions of a Set

4 — number of red skateboards

7 — total number of skateboards

$\frac{4}{7}$ of the skateboards are red. $\frac{4}{7}$ is a fraction.



4 is the **numerator** (parts selected).

7 is the **denominator** (total number of parts).

Exercises

1.

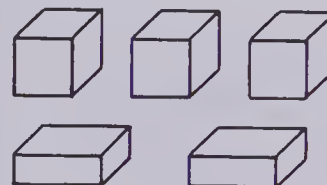


How many compact cars?

How many cars in all?

- Write a fraction for the cars which are compact cars.
- Write a fraction for the cars which are full-sized cars.

2.



How many cubes?

How many boxes in all?

- Write a fraction for the boxes which are cubes.
- Write a fraction for the boxes which are not cubes.

Write a fraction for the coloured part of each shape or each set.

3.



4.



5.

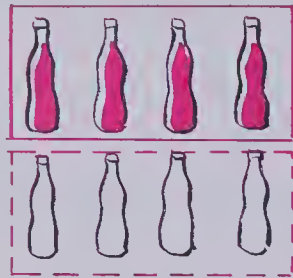


6.



- Write fractions for the uncoloured parts of each shape or set in Exercises 3 through 6. (Label the answers 3 (b), 4 (b), 5 (b), 6 (b).)

Parts of Sets



8
pop bottles.
 $\frac{1}{2}$ are full.

How many are full?

$$\frac{1}{2} \text{ of } 8 = 4$$

$$8 \div 2 = 4$$

4 bottles are full.



10
pop bottles.
 $\frac{1}{5}$ are full.

How many are full?

$$\frac{1}{5} \text{ of } 10 = 2$$

$$10 \div 5 = 2$$

2 bottles are full.

Exercises



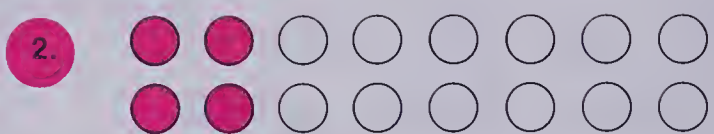
6 shapes.

$\frac{1}{3}$ are triangles.

How many are triangles?

$$\frac{1}{3} \text{ of } 6 = \blacksquare$$

$$6 \div 3 = \blacksquare$$



16 circles.

$\frac{1}{4}$ are coloured.

How many are coloured?

$$\frac{1}{4} \text{ of } 16 = \blacksquare$$

$$16 \div 4 = \blacksquare$$

Solve.

3. $\frac{1}{3}$ of 15 = \blacksquare

$$15 \div 3 = \blacksquare$$

4. $\frac{1}{2}$ of 18 = \blacksquare

$$18 \div 2 = \blacksquare$$

5. $\frac{1}{4}$ of 20 = \blacksquare

$$20 \div 4 = \blacksquare$$

6. $\frac{1}{5}$ of 15 = \blacksquare

$$15 \div 5 = \blacksquare$$

7. $\frac{1}{4}$ of 24 = \blacksquare

$$24 \div 4 = \blacksquare$$

8. $\frac{1}{2} \times 100 = \blacksquare$

$$100 \div 2 = \blacksquare$$

9. $\frac{1}{2}$ of 10 = \blacksquare

10. $\frac{1}{2}$ of 16 = \blacksquare

11. $\frac{1}{3}$ of 9 = \blacksquare

12. $\frac{1}{3}$ of 21 = \blacksquare

13. $\frac{1}{4}$ of 12 = \blacksquare

14. $\frac{1}{4}$ of 80 = \blacksquare

15. $\frac{1}{5}$ of 25 = \blacksquare

16. $\frac{1}{6}$ of 30 = \blacksquare

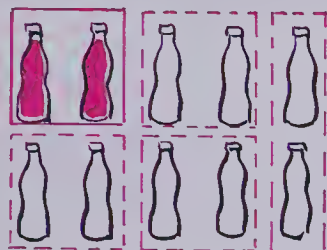
17. $\frac{1}{5}$ of 100 = \blacksquare

18. $\frac{1}{10}$ of 30 = \blacksquare

19. $\frac{1}{10}$ of 60 = \blacksquare

20. $\frac{1}{10}$ of 100 = \blacksquare

More Parts of Sets



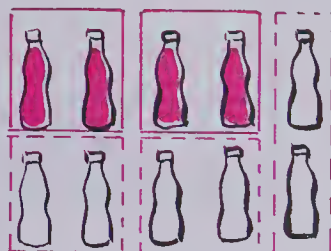
10
pop bottles.
 $\frac{1}{5}$ are full.

How many are full?

$$\frac{1}{5} \text{ of } 10 = 2$$

$$10 \div 5 = 2$$

2 bottles are full.



10
pop bottles.
 $\frac{2}{5}$ are full.

How many are full?

$$\frac{2}{5} \text{ of } 10 = 4$$

$$(10 \div 5) \times 2 = 4$$

4 bottles are full.

Think:

$\frac{2}{5}$ is twice

as many as

$\frac{1}{5}$

Exercises

1.



12 shapes.

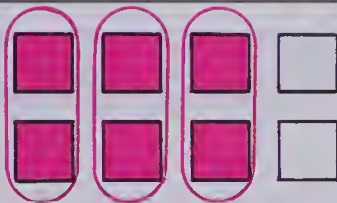
$\frac{2}{3}$ are triangles.

How many are triangles?

$$\frac{2}{3} \times 12 = \blacksquare$$

$$(12 \div 3) \times 2 = \blacksquare$$

2.



8 squares.

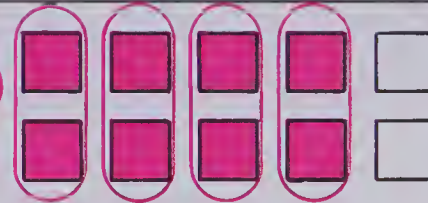
$\frac{3}{4}$ are coloured.

How many are coloured?

$$\frac{3}{4} \text{ of } 8 = \blacksquare$$

$$(8 \div 4) \times 3 = \blacksquare$$

3.



$\frac{4}{5}$ of the 10 squares

are coloured.

How many are coloured?

$$\frac{4}{5} \text{ of } 10 = \blacksquare$$

$$(10 \div 5) \times 4 = \blacksquare$$

Solve.

4. $\frac{2}{5}$ of 15 = \blacksquare

$$(15 \div 5) \times 2 = \blacksquare$$

5. $\frac{3}{5}$ of 15 = \blacksquare

$$(15 \div 5) \times 3 = \blacksquare$$

6. $\frac{4}{5}$ of 15 = \blacksquare

$$(15 \div 5) \times 4 = \blacksquare$$

7. $\frac{3}{4}$ of 24 = \blacksquare

$$(24 \div 4) \times 3 = \blacksquare$$

8. $\frac{2}{3}$ of 21 = \blacksquare

$$(21 \div 3) \times 2 = \blacksquare$$

9. $\frac{3}{5}$ of 25 = \blacksquare

$$(25 \div 5) \times 3 = \blacksquare$$

10. $\frac{2}{3}$ of 6 = \blacksquare

11. $\frac{2}{3}$ of 15 = \blacksquare

12. $\frac{3}{4}$ of 20 = \blacksquare

13. $\frac{3}{4}$ of 36 = \blacksquare

14. $\frac{5}{6}$ of 12 = \blacksquare

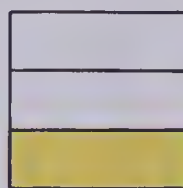
15. $\frac{7}{10}$ of 30 = \blacksquare

Comparing Halves, Thirds, Quarters, and Fifths

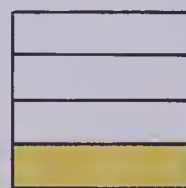
Amount
Coloured



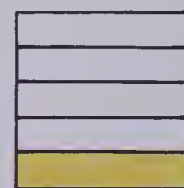
$$\frac{1}{2}$$



$$\frac{1}{3}$$



$$\frac{1}{4}$$



$$\frac{1}{5}$$

The largest coloured area

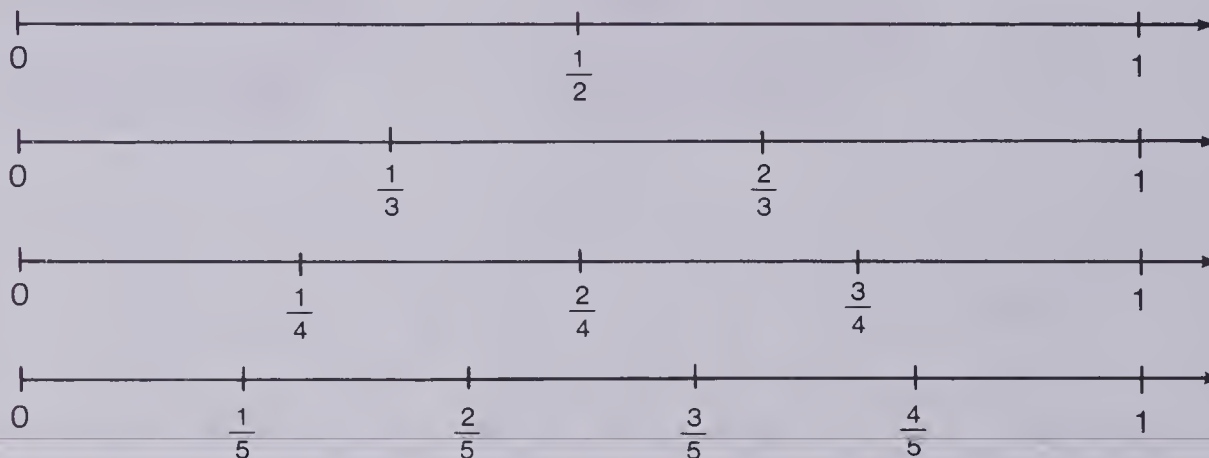
$$\frac{1}{2} > \frac{1}{5}$$

The smallest coloured area

$>$ means **is greater than.**
 $<$ means **is less than.**
 $=$ means **is equal to.**

You can also see that $\frac{1}{3} > \frac{1}{4}$, $\frac{1}{3} > \frac{1}{5}$, and $\frac{1}{4} > \frac{1}{5}$.

This can be shown on a number line.



Exercises

Using the number lines above, finish these statements so they are true statements.

1. $\frac{1}{2} > \blacksquare$

2. $\frac{1}{3} > \blacksquare$

3. $\frac{1}{4} > \blacksquare$

4. $\frac{2}{5} > \blacksquare$

5. $\frac{1}{2} < \blacksquare$

6. $\frac{3}{5} < \blacksquare$

7. $\frac{1}{2} = \blacksquare$

8. $\frac{2}{3} < \blacksquare$

9. $\frac{3}{5} \bullet \frac{3}{4}$

10. $\frac{3}{4} \bullet \frac{4}{5}$

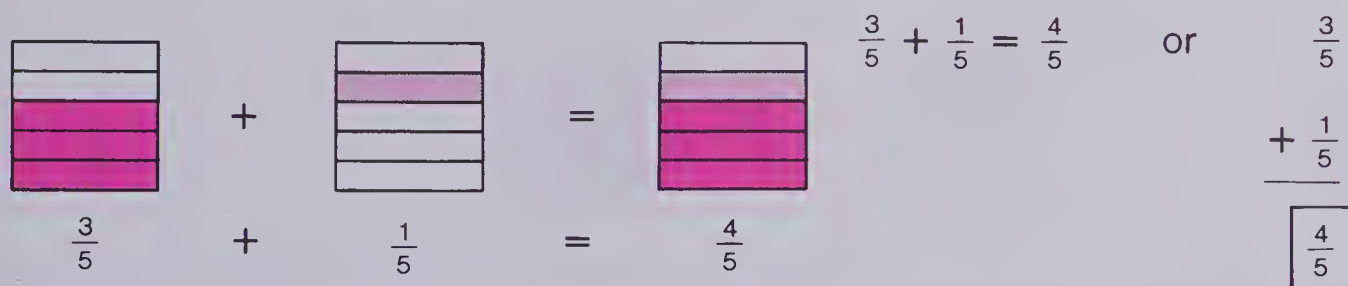
11. $\frac{1}{2} \bullet \frac{2}{4}$

12. $\frac{4}{5} \bullet \frac{2}{3}$

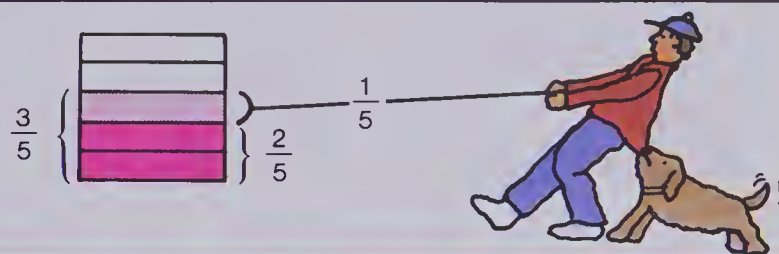
13. Place these fractions in order from smallest to largest.

$$\frac{1}{5}, \frac{1}{3}, \frac{4}{5}, \frac{1}{2}, \frac{1}{4}, \frac{3}{4}$$

Adding and Subtracting Fractions



$$\frac{3}{5} - \frac{1}{5} = \frac{2}{5} \quad \text{or} \quad \begin{array}{r} \frac{3}{5} \\ - \frac{1}{5} \\ \hline \frac{2}{5} \end{array}$$



When the denominators are the same *add* or *subtract* the numerators.

Exercises

Add.

1. $\frac{2}{5} + \frac{2}{5}$
2. $\frac{1}{4} + \frac{1}{4}$
3. $\frac{1}{3} + \frac{1}{3}$
4. $\frac{1}{2} + \frac{1}{2}$
5. $\frac{1}{6} + \frac{5}{6}$
6. $\frac{3}{8} + \frac{4}{8}$
7. $\frac{3}{10} + \frac{5}{10}$
8. $\frac{2}{7} + \frac{3}{7}$
9. $\frac{5}{8} + \frac{1}{8}$
10. $\frac{2}{10} + \frac{3}{10}$

Subtract.

11. $\frac{4}{5} - \frac{1}{5}$
12. $\frac{3}{4} - \frac{1}{4}$
13. $\frac{2}{3} - \frac{1}{3}$
14. $\frac{2}{2} - \frac{1}{2}$
15. $\frac{5}{6} - \frac{3}{6}$
16. $\frac{7}{8} - \frac{3}{8}$
17. $\frac{9}{10} - \frac{7}{10}$
18. $\frac{6}{7} - \frac{2}{7}$
19. $\frac{5}{8} - \frac{1}{8}$
20. $\frac{7}{10} - \frac{3}{10}$

Add or subtract. (Watch the operation signs!)

21. $\frac{6}{7} - \frac{4}{7}$
22. $\frac{2}{9} + \frac{5}{9}$
23. $\frac{7}{10} + \frac{2}{10}$
24. $\frac{3}{4} - \frac{2}{4}$
25. $\frac{3}{10} + \frac{7}{10}$
26. $\frac{8}{10} - \frac{5}{10}$
27. $\frac{3}{5} + \frac{1}{5}$
28. $\frac{5}{6} - \frac{4}{6}$
29. $\frac{8}{9} - \frac{5}{9}$
30. $\frac{5}{10} + \frac{4}{10}$

Sums Equal to or Greater Than One

Sometimes the sum equals *one*.



$\frac{3}{4}$

+



$\frac{1}{4}$

=



$\frac{4}{4}$

or 1

$$\begin{array}{r} \frac{3}{4} \\ + \frac{1}{4} \\ \hline \frac{4}{4} \text{ or } 1 \end{array}$$

Sometimes the sum is greater than *one*.



$\frac{2}{3}$

+



$\frac{2}{3}$

=



$\frac{4}{3}$

or $1\frac{1}{3}$

and



$$\begin{array}{r} \frac{2}{3} \\ + \frac{2}{3} \\ \hline \frac{4}{3} \text{ or } 1\frac{1}{3} \end{array}$$

Exercises

Add.

1. $\frac{3}{4} + \frac{3}{4}$

2. $\frac{1}{2} + \frac{1}{2}$

3. $\frac{4}{5} + \frac{4}{5}$

4. $\frac{5}{6} + \frac{5}{6}$

5. $\frac{4}{7} + \frac{4}{7}$

6. $\frac{7}{8} + \frac{5}{8}$

7. $\frac{3}{5} + \frac{4}{5}$

8. $\frac{5}{9} + \frac{8}{9}$

9. $\frac{7}{10} + \frac{9}{10}$

10. $\frac{1}{3} + \frac{2}{3}$

11. $\frac{3}{4} + \frac{1}{4}$

12. $\frac{6}{8} + \frac{4}{8}$

13. $\frac{2}{7} + \frac{5}{7}$

14. $\frac{3}{10} + \frac{9}{10}$

15. $\frac{4}{6} + \frac{3}{6}$

16. $\frac{3}{10} + \frac{7}{10}$

17. $\frac{7}{8} + \frac{7}{8}$

18. $\frac{8}{9} + \frac{7}{9}$

19. $\frac{2}{5} + \frac{3}{5}$

20. $\frac{9}{10} + \frac{9}{10}$

21. $\frac{3}{6} + \frac{3}{6}$

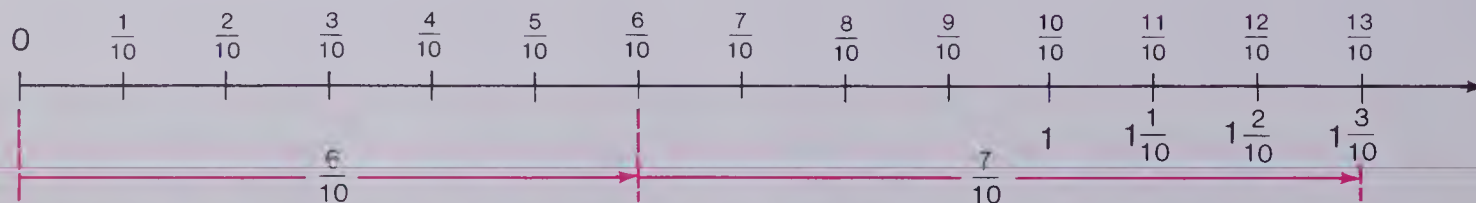
22. $\frac{5}{9} + \frac{6}{9}$

23. $\frac{7}{8} + \frac{6}{8}$

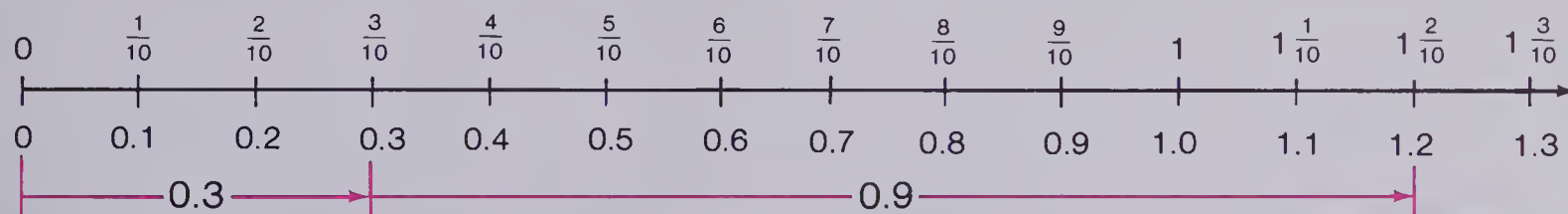
24. $\frac{5}{10} + \frac{5}{10}$

25. $\frac{8}{10} + \frac{6}{10}$

26. Use this number line to add $\frac{6}{10}$ and $\frac{7}{10}$.



Fractions and Decimals

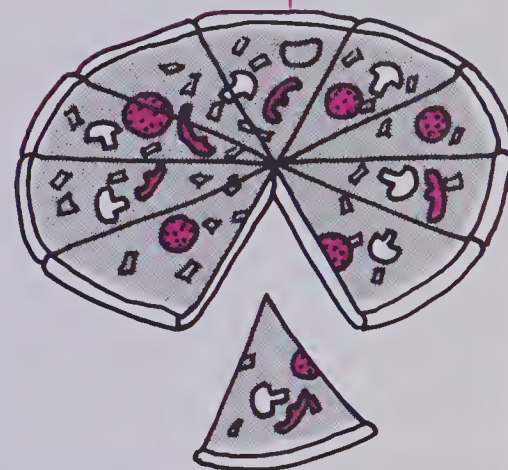


This number line shows fraction and decimal equivalents.

$$\boxed{\frac{3}{10} = 0.3}, \quad \boxed{\frac{9}{10} = 0.9}, \quad \text{and} \quad \boxed{1\frac{2}{10} = 1.2}.$$

0.9 is read “zero decimal nine”. 1.2 is read “one decimal two”.

$$0.3 + 0.9 = 1.2 \quad \text{or} \quad \begin{array}{r} 0.3 \\ + 0.9 \\ \hline 1.2 \end{array} \quad \text{or} \quad \begin{array}{r} \frac{3}{10} \\ + \frac{9}{10} \\ \hline \frac{12}{10} \end{array} \quad \text{or } 1\frac{2}{10} \quad \text{or } 1.2$$



Exercises

Write decimal equivalents for each.

1. $\frac{2}{10}$ 2. $\frac{7}{10}$ 3. 1 4. $1\frac{1}{10}$ 5. $1\frac{3}{10}$

Write fraction equivalents for each decimal.

6. 0.3 7. 0.5 8. 0.9 9. 1.0 10. 1.2

Add.

11. $\begin{array}{r} 0.8 \\ + 0.3 \\ \hline \end{array}$ 12. $\begin{array}{r} 0.5 \\ + 0.2 \\ \hline \end{array}$ 13. $\begin{array}{r} 0.7 \\ + 0.9 \\ \hline \end{array}$ 14. $\begin{array}{r} 0.9 \\ + 0.8 \\ \hline \end{array}$ 15. $\begin{array}{r} 0.6 \\ + 0.5 \\ \hline \end{array}$

Subtract.

16. $\begin{array}{r} 0.8 \\ - 0.5 \\ \hline \end{array}$ 17. $\begin{array}{r} 0.7 \\ - 0.2 \\ \hline \end{array}$ 18. $\begin{array}{r} 1.3 \\ - 0.8 \\ \hline \end{array}$ 19. $\begin{array}{r} 1.6 \\ - 0.3 \\ \hline \end{array}$ 20. $\begin{array}{r} 1.5 \\ - 0.9 \\ \hline \end{array}$

Add.

- ★ 21. $0.7 + \frac{9}{10}$ ★ 22. $\frac{3}{10} + 1.2$ ★ 23. $\frac{9}{10} + 0.9$ ★ 24. $\frac{8}{10} + 3.2$ ★ 25. $1\frac{2}{10} + 2.5$

Tenths, Hundredths, and Thousandths

thousands	hundreds	tens	ones	tenths	hundredths	thousandths
			0	3		
			0	3	7	
			0	3	7	2
			0	0	9	
			0	0	0	5
			0	0	2	6

0.3 means 3 tenths or $\frac{3}{10}$.

0.37 means 37 hundredths or $\frac{37}{100}$.

0.372 means 372 thousandths or $\frac{372}{1000}$.

0.09 means 9 hundredths or $\frac{9}{100}$.

0.005 means 5 thousandths or $\frac{5}{1000}$.

0.026 means 26 thousandths or $\frac{26}{1000}$.

Exercises

Express each as a fraction.

1. $0.72 = \frac{72}{100}$

2. $0.13 = \frac{\blacksquare}{100}$

3. $0.716 = \frac{\blacksquare}{1000}$

4. 0.25

5. 0.592

6. 0.159

7. 0.043

8. 0.407

9. 0.006

10. 0.652

Express each as a decimal.

11. $\frac{56}{100} = 0.56$

12. $\frac{637}{1000}$

13. $\frac{5}{10}$

14. $\frac{193}{1000}$

15. $\frac{8}{100}$

16. $\frac{83}{100}$

17. $\frac{382}{1000}$

18. $\frac{75}{1000}$

19. $\frac{9}{1000}$

20. $\frac{38}{1000}$

Tune Up

Add.

$$\begin{array}{r} 1. \quad 7.4 \\ +9.3 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 8.67 \\ +0.15 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 7.01 \\ +4.37 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 19.19 \\ + 2.76 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 0.95 \\ +0.81 \\ \hline \end{array}$$

Subtract.

$$\begin{array}{r} 6. \quad 0.9 \\ -0.4 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 0.93 \\ -0.77 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 0.83 \\ -0.27 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 1.93 \\ -1.69 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 14.12 \\ - 7.85 \\ \hline \end{array}$$

Add.

$$\begin{array}{r} 11. \quad 16.07 \\ 12.31 \\ +51.28 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 9.35 \\ 12.08 \\ +29.26 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad \$14.99 \\ 36.25 \\ +29.50 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad \$235.79 \\ 127.03 \\ +391.52 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad \$500.75 \\ 14.89 \\ + 5.17 \\ \hline \end{array}$$

Subtract.

$$\begin{array}{r} 16. \quad 12.79 \\ - 5.34 \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad 89.07 \\ -43.81 \\ \hline \end{array}$$

$$\begin{array}{r} 18. \quad 597.52 \\ - 39.79 \\ \hline \end{array}$$

$$\begin{array}{r} 19. \quad \$98.17 \\ - 35.84 \\ \hline \end{array}$$

$$\begin{array}{r} 20. \quad \$385.09 \\ - 137.93 \\ \hline \end{array}$$

Add.

$$\begin{array}{r} 21. \quad \$12.85 \\ 7.23 \\ 1.79 \\ + 4.36 \\ \hline \end{array}$$

$$\begin{array}{r} 22. \quad \$17.27 \\ 87.35 \\ 46.29 \\ +75.02 \\ \hline \end{array}$$

$$\begin{array}{r} 23. \quad \$358.07 \\ 209.23 \\ 465.39 \\ +148.71 \\ \hline \end{array}$$

$$\begin{array}{r} 24. \quad \$875.99 \\ 27.03 \\ 9.75 \\ + 80.29 \\ \hline \end{array}$$

$$\begin{array}{r} 25. \quad \$ 17.05 \\ 449.72 \\ 300.00 \\ + 58.63 \\ \hline \end{array}$$

Multiply.

$$\begin{array}{r} 26. \quad 2.78 \\ \times 0.4 \\ \hline \end{array}$$

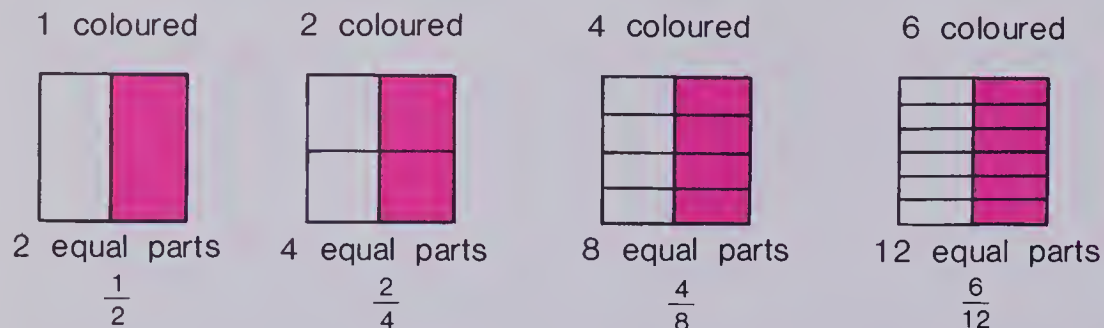
$$\begin{array}{r} 27. \quad 41.3 \\ \times 0.5 \\ \hline \end{array}$$

$$\begin{array}{r} 28. \quad \$12.89 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 29. \quad \$9.75 \\ \times 0.12 \\ \hline \end{array}$$

$$\begin{array}{r} 30. \quad \$75.50 \\ \times 0.9 \\ \hline \end{array}$$

Equivalent Fractions



All these fractions are **equivalent** because the same area is shaded.

Multiplication Chart

X	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

$\frac{1}{2}$ points to row 1 and column 2.
 $\frac{3}{8}$ points to row 3 and column 8.
 $\frac{7}{5}$ points to row 7 and column 5, with an arrow pointing to the result $\frac{42}{30}$.

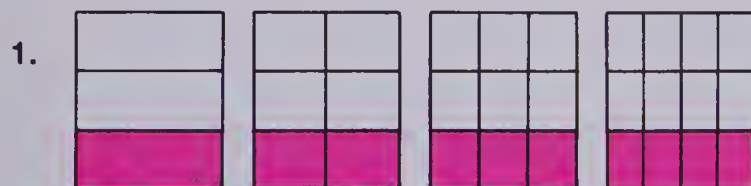
On the multiplication chart:

- $\frac{1}{2} = \frac{2}{4}$ in the 2 times column.
- $\frac{1}{2} = \frac{4}{8}$ in the 4 times column.
- $\frac{1}{2} = \frac{6}{12}$ in the 6 times column.
- $\frac{1}{2} = \frac{10}{20}$ in the 10 times column.

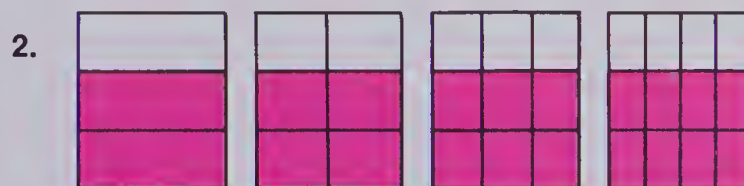
Both the numerator and denominator are multiplied by the same amount.

Exercises

Use these diagrams to write equivalent fractions.



$$\frac{1}{3} = \frac{\blacksquare}{6} \quad \frac{1}{3} = \frac{\blacksquare}{9} \quad \frac{1}{3} = \frac{\blacksquare}{12}$$



$$\frac{2}{3} = \frac{\blacksquare}{6} \quad \frac{2}{3} = \frac{\blacksquare}{9} \quad \frac{2}{3} = \frac{\blacksquare}{12}$$

Use the multiplication chart to write five equivalent fractions for each of the following.

3. $\frac{2}{3} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare}$ 4. $\frac{3}{4}$ 5. $\frac{3}{5}$ 6. $\frac{3}{10}$ 7. $\frac{1}{8}$
 8. $\frac{1}{6}$ 9. $\frac{5}{8}$ 10. $\frac{2}{5}$ 11. $\frac{5}{6}$ 12. $\frac{2}{9}$ 13. $\frac{7}{10}$
 14. $\frac{4}{5}$ 15. $\frac{9}{10}$ 16. $\frac{3}{2}$ 17. $\frac{5}{4}$ 18. $\frac{7}{2}$ 19. $\frac{6}{5}$

20. Exercises 16 to 19 are **improper fractions**. What is an improper fraction?

Use the multiplication chart to find these specific equivalent fractions.

21. $\frac{1}{2} = \frac{\blacksquare}{10}$ 22. $\frac{3}{4} = \frac{\blacksquare}{12}$ 23. $\frac{7}{10} = \frac{\blacksquare}{20}$ 24. $\frac{5}{6} = \frac{\blacksquare}{30}$
 25. $\frac{4}{5} = \frac{\blacksquare}{40}$ 26. $\frac{6}{10} = \frac{\blacksquare}{50}$ 27. $\frac{5}{8} = \frac{\blacksquare}{64}$ 28. $\frac{5}{7} = \frac{\blacksquare}{56}$
 29. $\frac{6}{9} = \frac{\blacksquare}{36}$ 30. $\frac{3}{5} = \frac{\blacksquare}{30}$ 31. $\frac{8}{10} = \frac{\blacksquare}{70}$ 32. $\frac{2}{5} = \frac{\blacksquare}{45}$
 33. $\frac{8}{5} = \frac{\blacksquare}{10}$ 34. $\frac{5}{2} = \frac{\blacksquare}{16}$ 35. $\frac{7}{4} = \frac{\blacksquare}{32}$ 36. $\frac{7}{6} = \frac{\blacksquare}{30}$

BRAINTICKLER

How many different 3-digit numbers can you make using only the digits 2, 5, 7, and 8? You can use a digit only once in any number.

Example: 257, 258, 278, etc.

Equivalent Fractions

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30

From the chart we know:

$$\frac{2}{3} = \frac{8}{12} \text{ in the 4 times column}$$

and

$$\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}.$$

Both parts are in the *same column* so both parts of the fraction were multiplied by the *same amount*.

Example $\frac{2}{3} = \frac{\blacksquare}{21}, \frac{2}{3} = \frac{2 \times 7}{3 \times 7} = \frac{14}{21}$. We multiply both parts by 7.

Exercises

Copy and complete.

1. $\frac{2}{3} = \frac{2 \times 5}{3 \times 5} = \frac{\blacksquare}{15}$

2. $\frac{3}{4} = \frac{3 \times 6}{4 \times 6} = \frac{\blacksquare}{24}$

3. $\frac{5}{8} = \frac{5 \times \blacksquare}{8 \times \blacksquare} = \frac{\blacksquare}{16}$

4. $\frac{2}{5} = \frac{2 \times \blacksquare}{5 \times \blacksquare} = \frac{\blacksquare}{35}$

5. $\frac{7}{10} = \frac{\blacksquare}{50}$

6. $\frac{3}{8} = \frac{\blacksquare}{24}$

7. $\frac{3}{10} = \frac{\blacksquare}{60}$

8. $\frac{4}{5} = \frac{\blacksquare}{30}$

9. $\frac{5}{6} = \frac{\blacksquare}{42}$

10. $\frac{1}{10} = \frac{\blacksquare}{40}$

11. $\frac{7}{8} = \frac{\blacksquare}{40}$

12. $\frac{3}{10} = \frac{\blacksquare}{20}$

13. $\frac{3}{5} = \frac{\blacksquare}{20}$

14. $\frac{3}{2} = \frac{\blacksquare}{10}$

15. $\frac{7}{4} = \frac{\blacksquare}{16}$

16. $\frac{5}{3} = \frac{\blacksquare}{18}$

Reduced Fractions

$\frac{8}{12}$ can be expressed as an equivalent fraction in **lowest terms**.

$$\frac{8}{12} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3}$$

Both the numerator and denominator are divided by the same amount.

Reduce each to *lowest terms*: $\frac{6}{15}$, $\frac{30}{40}$.

$$\frac{6}{15} = \frac{6 \div \boxed{3}}{15 \div \boxed{3}} = \frac{2}{5}$$

and

$$\frac{30}{40} = \frac{30 \div \boxed{10}}{40 \div \boxed{10}} = \frac{3}{4}$$

Exercises

Express these fractions in lowest terms.

1. $\frac{2}{10} = \frac{2 \div \blacksquare}{10 \div \blacksquare} = \frac{\blacksquare}{\blacksquare}$

2. $\frac{3}{12} = \frac{3 \div \blacksquare}{12 \div \blacksquare} = \frac{\blacksquare}{\blacksquare}$

3. $\frac{4}{12}$

4. $\frac{5}{10}$

5. $\frac{3}{9}$

6. $\frac{5}{25}$

7. $\frac{4}{10}$

8. $\frac{9}{15}$

9. $\frac{8}{12}$

10. $\frac{9}{24}$

11. $\frac{10}{15}$

12. $\frac{8}{20}$

13. $\frac{21}{24}$

14. $\frac{15}{25}$

15. $\frac{14}{20}$

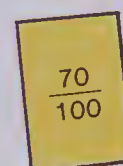
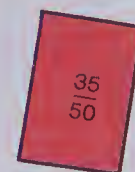
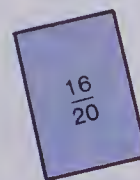
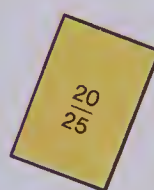
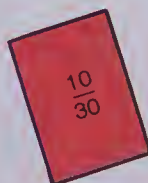
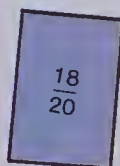
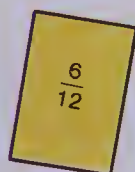
16. $\frac{3}{6}$

17. $\frac{40}{50}$

18. $\frac{32}{40}$

19. Write the following fractions on cards.

Write the equivalent fraction in lowest terms on the back of the cards.



20. Make up 5 equivalent fraction cards like those above.
Use them as flashcards with a classmate.

Checking Equivalent Fractions

Is $\frac{6}{8} = \frac{3}{4}$?

$$\begin{array}{l} \frac{6}{8} \text{ and } \frac{3}{4} \rightarrow 8 \times 3 = 24 \\ \frac{6}{8} \text{ and } \frac{3}{4} \rightarrow 6 \times 4 = 24 \end{array}$$

Yes — $\frac{6}{8} = \frac{3}{4}$.



$\frac{6}{8}$



$\frac{3}{4}$

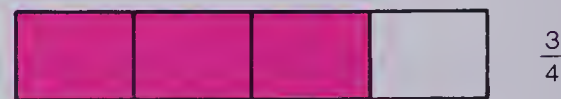
Is $\frac{2}{3} = \frac{3}{4}$?

$$\begin{array}{l} \frac{2}{3} \text{ and } \frac{3}{4} \rightarrow 3 \times 3 = 9 \\ \frac{2}{3} \text{ and } \frac{3}{4} \rightarrow 2 \times 4 = 8 \end{array}$$

No — $\frac{2}{3} \neq \frac{3}{4}$



$\frac{2}{3}$



$\frac{3}{4}$

Exercises

Complete to check for equivalents.

1. $\frac{2}{8}$ and $\frac{3}{12}$

$$\begin{array}{l} \frac{2}{8} \text{ and } \frac{3}{12} \rightarrow 8 \times \blacksquare = \blacksquare \\ \frac{2}{8} \text{ and } \frac{3}{12} \rightarrow 2 \times \blacksquare = \blacksquare \end{array}$$

Are $\frac{2}{8}$ and $\frac{3}{12}$ equivalent?

2. $\frac{3}{5}$ and $\frac{5}{7}$

$$\begin{array}{l} \frac{3}{5} \text{ and } \frac{5}{7} \rightarrow \blacksquare \times \blacksquare = \blacksquare \\ \frac{3}{5} \text{ and } \frac{5}{7} \rightarrow \blacksquare \times \blacksquare = \blacksquare \end{array}$$

Are $\frac{3}{5}$ and $\frac{5}{7}$ equivalent?

Which pairs are equivalent fractions?

3. $\frac{1}{2}$ and $\frac{3}{5}$ → ?

4. $\frac{3}{9}$ and $\frac{2}{6}$ → ?

5. $\frac{2}{10}$ and $\frac{3}{24}$

6. $\frac{2}{10}$ and $\frac{3}{15}$

7. $\frac{10}{15}$ and $\frac{3}{4}$

8. $\frac{4}{12}$ and $\frac{6}{18}$

9. $\frac{15}{24}$ and $\frac{3}{8}$

10. $\frac{1}{3}$ and $\frac{33}{100}$

Write = or \neq for each ● .

11. $\frac{2}{7}$ ● $\frac{7}{25}$

12. $\frac{7}{8}$ ● $\frac{18}{20}$

13. $\frac{6}{8}$ ● $\frac{9}{12}$

14. $\frac{6}{15}$ ● $\frac{10}{15}$

Using Cross Products

We can use cross products to find equivalent fractions.

We wish to solve for N.

$$\begin{array}{c} \frac{3}{4} = \frac{9}{N} \\ \swarrow \quad \searrow \\ 3 \times N = 4 \times 9 \\ 3 \times N = 36 \\ N = 12 \end{array}$$

The equivalent fractions are

$$\frac{3}{4} = \frac{9}{12}$$

$$\begin{array}{c} \frac{2}{6} = \frac{N}{9} \\ \swarrow \quad \searrow \\ 2 \times 9 = 6 \times N \\ 18 = 6 \times N \\ N = 3 \end{array}$$

The equivalent fractions are

$$\frac{2}{6} = \frac{3}{9}$$

Exercises

Complete to find equivalent fractions.

$$\begin{array}{c} 1. \quad \frac{3}{4} = \frac{6}{N} \\ \swarrow \quad \searrow \\ \square \times N = 4 \times \square \\ \square \times N = \square \\ N = \square \end{array}$$

Equivalent fractions are

$$\frac{3}{4} = \frac{6}{\square}$$

$$\begin{array}{c} 2. \quad \frac{2}{3} = \frac{N}{9} \\ \swarrow \quad \searrow \\ \square \times N = \square \times 9 \\ \square \times N = \square \\ N = \square \end{array}$$

Equivalent fractions are

$$\frac{2}{3} = \frac{\square}{9}$$

3. $\frac{2}{7} = \frac{N}{14}$

4. $\frac{3}{10} = \frac{N}{100}$

5. $\frac{5}{6} = \frac{N}{12}$

6. $\frac{2}{3} = \frac{N}{12}$

7. $\frac{4}{4} = \frac{N}{3}$

8. $\frac{1}{4} = \frac{6}{N}$

9. $\frac{2}{7} = \frac{6}{N}$

10. $\frac{3}{5} = \frac{15}{N}$

11. $\frac{7}{10} = \frac{7}{N}$

12. $\frac{4}{5} = \frac{12}{N}$

BRAINTICKLER

Find a fraction equivalent to $\frac{4}{5}$ and has a denominator 7 more than its numerator.



Mixed Numerals

Fractions like $\frac{3}{2}$, $\frac{5}{4}$, $\frac{7}{2}$, and $\frac{6}{5}$ are called **improper fractions**.

The numerators are larger than the denominators.

These can be expressed as **mixed numerals**.

$$\frac{3}{2} = 1\frac{1}{2}$$

$$\frac{5}{4} = 1\frac{1}{4}$$

$$\begin{aligned}\frac{7}{2} &= 3\frac{1}{2} \\ &= 1 + 1 + 1 + \frac{1}{2} \\ &= 3\frac{1}{2}\end{aligned}$$

$1\frac{1}{2}$, $1\frac{1}{4}$, and $3\frac{1}{2}$ are mixed numerals.

Exercises

Express the following fractions as mixed numerals.

1. $\frac{4}{3} = 1\frac{1}{3}$

2. $\frac{7}{4} = 1\frac{3}{4}$

3. $\frac{8}{5}$

4. $\frac{11}{6}$

5. $\frac{13}{10}$

6. $\frac{15}{8}$

7. $\frac{9}{5}$

8. $\frac{5}{3}$

9. $\frac{6}{5}$

10. $\frac{17}{12}$

11. $\frac{11}{8}$

12. $\frac{17}{10}$

13. $\frac{12}{5}$

14. $\frac{7}{2}$

Reduce to lowest terms. Express as a mixed numeral.

The first one is done for you.

15. $\frac{10}{4} = \frac{10 \div 2}{4 \div 2}$
 $= \frac{5}{2}$
 $= 2\frac{1}{2}$

16. $\frac{15}{6} = \frac{15 \div 3}{6 \div 3}$
 $= \frac{5}{2}$
 $= 2\frac{1}{2}$

17. $\frac{12}{8}$

18. $\frac{35}{10}$

19. $\frac{21}{9}$

20. $\frac{14}{8}$

21. $\frac{30}{12}$

22. $\frac{20}{12}$

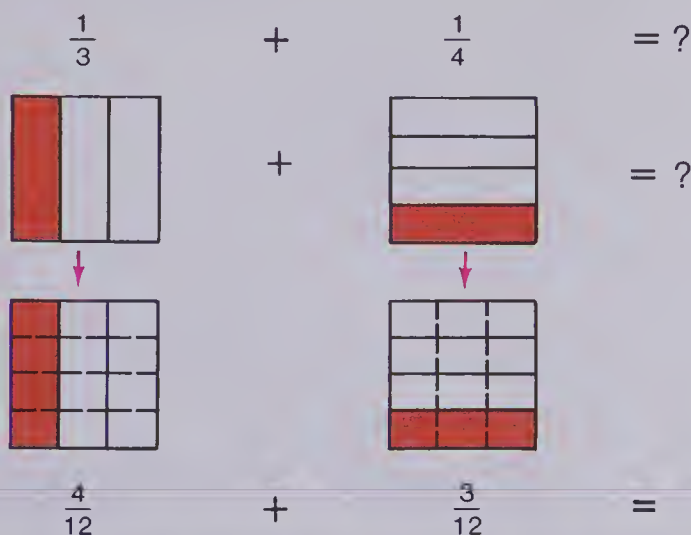
23. $\frac{18}{4}$

24. $\frac{55}{15}$

25. $\frac{24}{16}$

★ 26. $\frac{96}{30}$

Common Denominators



These fractions cannot be added in this form because the denominators are not the same.

Thirds and quarters can be changed to twelfths.

The **common denominator** is twelve.

Exercises

Find the common denominator. Draw a picture of the new parts.

Find the fraction for each ? .

1.



+



+

$\frac{1}{3}$

= ?

$\frac{1}{2}$

2.



+



+

$\frac{1}{3}$

= ?

$\frac{2}{5}$

3.



+



+

$\frac{2}{5}$

= ?

$\frac{1}{2}$

4.



+



+

$\frac{1}{3}$

=

$\frac{1}{4}$

5.



+



+

$\frac{1}{5}$

= ?

$\frac{2}{3}$

6.



+



+

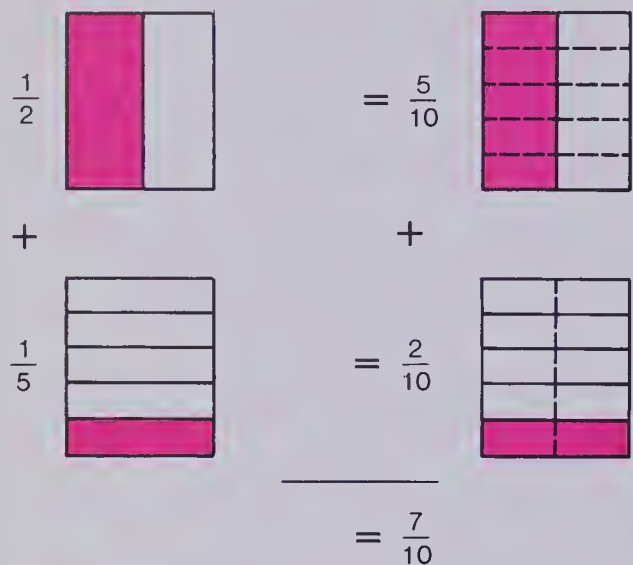
$\frac{1}{4}$

= ?

$\frac{2}{5}$

★ 7. How can you find the common denominator in each case (without a diagram)?

Adding with Common Denominators



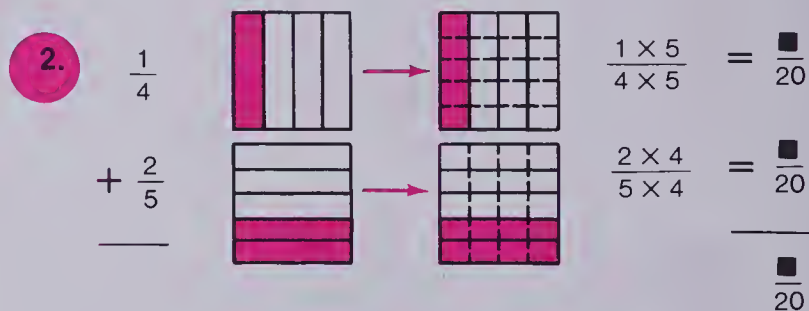
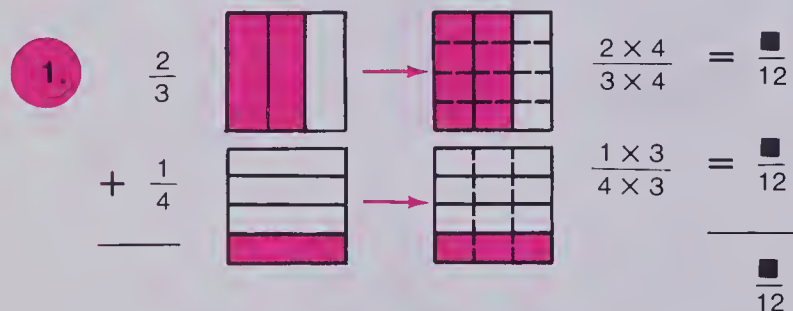
$$\begin{array}{r} \frac{1 \times 5}{2 \times 5} = \frac{5}{10} \\ + \frac{1 \times 2}{5 \times 2} = \frac{2}{10} \\ \hline \frac{7}{10} \end{array}$$

The common denominator is 10 because the product of the denominators is 10.

$$2 \times 5 = 10$$

Exercises

Copy and complete.



Add using common denominators.

3. $\frac{1}{2} + \frac{1}{3} = \frac{\square}{\square}$

4. $\frac{2}{5} + \frac{1}{3} = \frac{\square}{\square}$

5. $\frac{1}{8} + \frac{3}{5} = \frac{\square}{\square}$

6. $\frac{1}{3} + \frac{2}{7} = \frac{\square}{\square}$

7. $\frac{3}{10} + \frac{1}{3} = \frac{\square}{\square}$

8. $\frac{3}{8} + \frac{1}{3} = \frac{\square}{\square}$

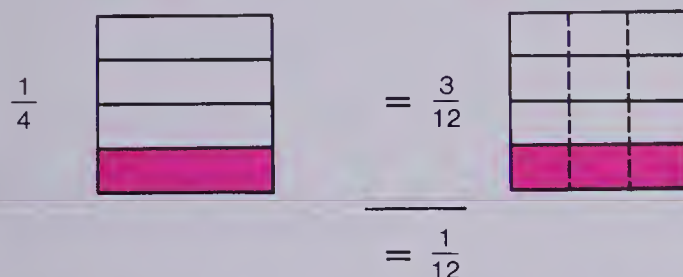
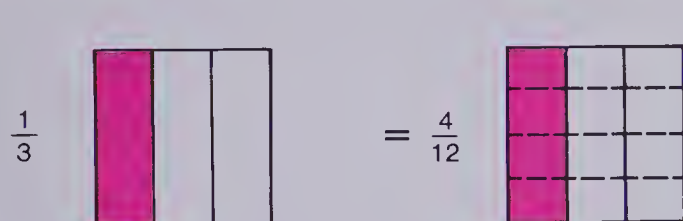
9. $\frac{1}{10} + \frac{1}{2} = \frac{\square}{\square}$

10. $\frac{2}{9} + \frac{1}{2} = \frac{\square}{\square}$

11. $\frac{1}{6} + \frac{4}{5} = \frac{\square}{\square}$

12. $\frac{4}{9} + \frac{1}{4} = \frac{\square}{\square}$

Subtracting with Common Denominators



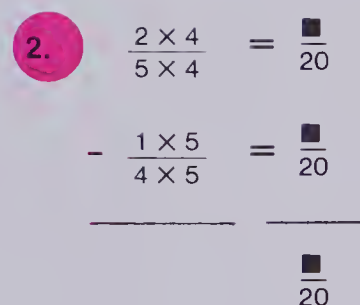
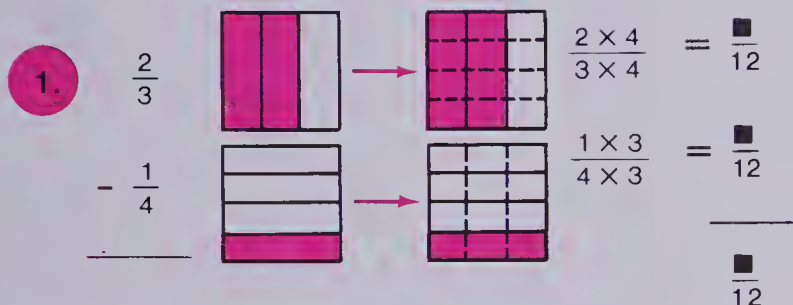
$$\begin{array}{r} \frac{1 \times 4}{3 \times 4} = \frac{4}{12} \\ - \frac{1 \times 3}{4 \times 3} = \frac{3}{12} \\ \hline \frac{1}{12} \end{array}$$

The common denominator is 12, because the product of the denominators is 12.

$$3 \times 4 = 12$$

Exercises

Copy and complete.



Subtract using common denominators.

3. $\frac{1}{2}$

$-\frac{1}{3}$

4. $\frac{4}{5}$

$-\frac{2}{3}$

5. $\frac{5}{8}$

$-\frac{2}{5}$

6. $\frac{2}{3}$

$-\frac{1}{7}$

7. $\frac{7}{10}$

$-\frac{2}{3}$

Write in a vertical format and subtract.

8. $\frac{7}{8} - \frac{1}{3}$

9. $\frac{9}{10} - \frac{1}{2}$

10. $\frac{8}{9} - \frac{1}{2}$

11. $\frac{5}{6} - \frac{2}{5}$

12. $\frac{4}{9} - \frac{1}{4}$

13. $\frac{1}{5} - \frac{1}{8}$

14. $\frac{1}{3} - \frac{1}{10}$

15. $\frac{1}{4} - \frac{1}{5}$

Adding and Subtracting Fractions

Add.

$$\begin{array}{r} \frac{3}{4} = \frac{15}{20} \\ + \frac{2}{5} = \frac{8}{20} \\ \hline \frac{23}{20} \text{ or } 1\frac{3}{20} \end{array}$$

Think:

$$\begin{array}{l} \frac{3}{4} = \frac{3 \times 5}{4 \times 5} = \frac{15}{20} \\ \frac{2}{5} = \frac{2 \times 4}{5 \times 4} = \frac{8}{20} \end{array}$$

Subtract.

$$\begin{array}{r} \frac{3}{4} = \frac{15}{20} \\ - \frac{2}{5} = \frac{8}{20} \\ \hline \frac{7}{20} \end{array}$$

Sometimes the answer is greater than 1.

Exercises

Perform the indicated operations.

1. $\frac{1}{4} = \frac{\blacksquare}{20}$
 $+ \frac{3}{5} = \frac{\blacksquare}{20}$
 $\hline \frac{\blacksquare}{\blacksquare}$

2. $\frac{1}{10} = \frac{\blacksquare}{30}$
 $+ \frac{2}{3} = \frac{\blacksquare}{30}$
 $\hline \frac{\blacksquare}{\blacksquare}$

3. $\frac{7}{8} = \frac{\blacksquare}{24}$
 $- \frac{2}{3} = \frac{\blacksquare}{24}$
 $\hline \frac{\blacksquare}{\blacksquare}$

4. $\frac{3}{4}$
 $- \frac{2}{5}$
 \hline

5. $\frac{5}{8}$
 $+ \frac{4}{5}$
 \hline

6. $\frac{7}{10}$
 $+ \frac{2}{3}$
 \hline

7. $\frac{9}{10}$
 $- \frac{3}{4}$
 \hline

8. $\frac{3}{10}$
 $+ \frac{1}{2}$
 \hline

9. $\frac{7}{8}$
 $- \frac{1}{3}$
 \hline

10. $\frac{3}{5}$
 $+ \frac{5}{6}$
 \hline

11. $\frac{7}{8}$
 $- \frac{3}{5}$
 \hline

12. $\frac{3}{4}$
 $+ \frac{2}{5}$
 \hline

13. $\frac{3}{10}$
 $- \frac{1}{4}$
 \hline

14. $\frac{4}{5}$
 $- \frac{2}{3}$
 \hline

15. $\frac{7}{8}$
 $+ \frac{2}{3}$
 \hline

★ 16. $\frac{7}{5}$
 $- \frac{4}{3}$
 \hline

★ 17. $\frac{9}{8}$
 $+ \frac{5}{3}$
 \hline

★ 18. $\frac{12}{5}$
 $- \frac{7}{6}$
 \hline

Least Common Denominators

Sometimes the common denominator is the larger denominator or a multiple of the larger denominator.

$$\frac{3}{5} = \frac{6}{10}$$

$$+ \frac{7}{10} = \frac{7}{10}$$

$$\boxed{\frac{13}{10}} \text{ or } \boxed{1\frac{3}{10}}$$

10 is a multiple of 5.
10 is the **least common denominator**.

$$\frac{3}{10} = \frac{6}{20}$$

$$+ \frac{1}{4} = \frac{5}{20}$$

$$\boxed{\frac{11}{20}}$$

20 is a multiple of 10.
20 is also a multiple of 4.
20 is the **least common denominator**.

$$\frac{7}{10} = \frac{28}{40}$$

$$- \frac{1}{8} = \frac{5}{40}$$

$$\boxed{\frac{23}{40}}$$

40 is a multiple of 10.
40 is also a multiple of 8.
40 is the **least common denominator**.

Exercises

Add or subtract using the least common denominators.

1.

$$\frac{1}{2} = \frac{\blacksquare}{10}$$

$$+ \frac{3}{10} = \frac{3}{10}$$

$$\frac{\blacksquare}{\blacksquare}$$

2.

$$\frac{3}{4} = \frac{\blacksquare}{20}$$

$$+ \frac{9}{10} = \frac{\blacksquare}{20}$$

$$\frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare}$$

3.

$$\frac{1}{2} = \frac{\blacksquare}{6}$$

$$+ \frac{1}{6} = \frac{\blacksquare}{6}$$

4.

$$\frac{3}{4} = \frac{\blacksquare}{8}$$

$$+ \frac{1}{8} = \frac{\blacksquare}{8}$$

5.

$$\frac{1}{6} = \frac{\blacksquare}{6}$$

$$+ \frac{1}{3} = \frac{\blacksquare}{6}$$

6.

$$\frac{3}{10} = \frac{\blacksquare}{10}$$

$$+ \frac{3}{4} = \frac{\blacksquare}{40}$$

7.

$$\frac{13}{15} = \frac{\blacksquare}{15}$$

$$+ \frac{5}{6} = \frac{\blacksquare}{30}$$

8.

$$\frac{4}{5} = \frac{\blacksquare}{15}$$

$$+ \frac{7}{15} = \frac{\blacksquare}{15}$$

9.

$$\frac{7}{10} = \frac{\blacksquare}{10}$$

$$- \frac{1}{2} = \frac{\blacksquare}{10}$$

10.

$$\frac{5}{6} = \frac{\blacksquare}{6}$$

$$- \frac{1}{4} = \frac{\blacksquare}{12}$$

11.

$$\frac{7}{8} = \frac{\blacksquare}{8}$$

$$- \frac{3}{4} = \frac{\blacksquare}{8}$$

12.

$$\frac{9}{10} = \frac{\blacksquare}{10}$$

$$- \frac{5}{6} = \frac{\blacksquare}{30}$$

13.

$$\frac{5}{6} = \frac{\blacksquare}{6}$$

$$- \frac{3}{4} = \frac{\blacksquare}{12}$$

14.

$$\frac{7}{8} = \frac{\blacksquare}{8}$$

$$- \frac{5}{12} = \frac{\blacksquare}{24}$$

15.

$$\frac{11}{12} = \frac{\blacksquare}{12}$$

$$- \frac{3}{8} = \frac{\blacksquare}{24}$$

The Variety Store

Darin had a part-time job in a variety store.

He worked $4\frac{3}{4}$ h on Friday evening and $7\frac{1}{4}$ h on Saturday.

How many hours did he work?

$$4\frac{3}{4} = 4 + \frac{3}{4}$$

$$+ 7\frac{1}{4} = 7 + \frac{1}{4}$$

$$11 + \frac{4}{4} = \boxed{11\frac{4}{4}} \text{ or } \boxed{12} \quad \text{Darin worked 12 h.}$$

Find the common denominator and add.

$$3\frac{1}{4} = 3 + \frac{3}{12}$$

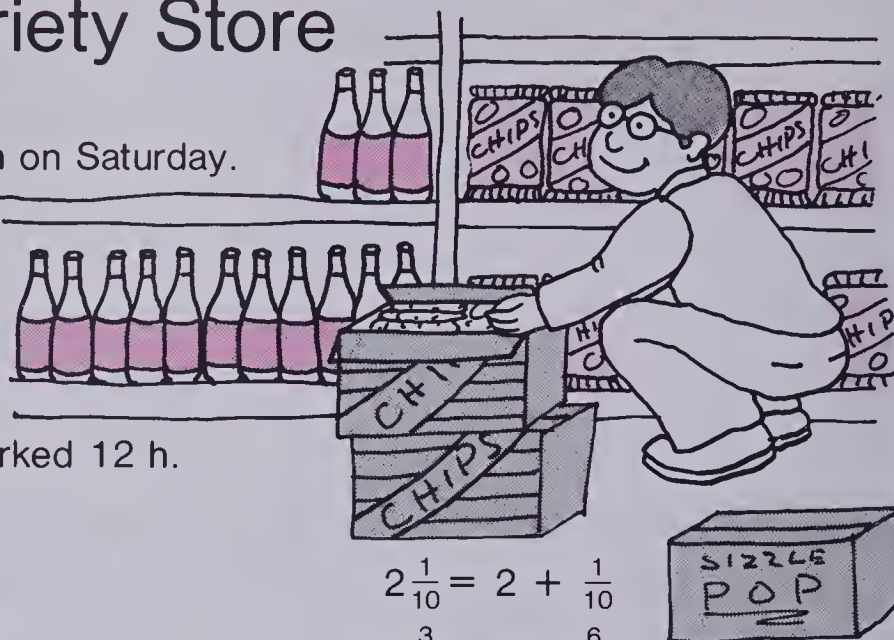
$$+ 2\frac{1}{3} = 2 + \frac{4}{12}$$

$$5 + \frac{7}{12} = \boxed{5\frac{7}{12}}$$

$$2\frac{1}{10} = 2 + \frac{1}{10}$$

$$+ 6\frac{3}{5} = 6 + \frac{6}{10}$$

$$8 + \frac{7}{10} = \boxed{8\frac{7}{10}}$$



Exercises

Add.

1. $3\frac{2}{5} = 3 + \frac{2}{5}$

$$+ 4\frac{1}{5} = 4 + \frac{1}{5}$$

$$\blacksquare + \frac{\blacksquare}{\blacksquare} = \blacksquare\frac{\blacksquare}{\blacksquare}$$

2. $2\frac{1}{10} = 2 + \frac{1}{10}$

$$+ 5\frac{7}{10} = 5 + \frac{7}{10}$$

$$\blacksquare + \frac{\blacksquare}{\blacksquare} = \blacksquare\frac{\blacksquare}{\blacksquare}$$

3. $5\frac{3}{8} + 2\frac{1}{8}$

4. $6\frac{1}{6} + 1\frac{2}{6}$

5. $4\frac{3}{10} + 2\frac{1}{10}$

6. $8\frac{5}{12} + 6\frac{2}{12}$

Find the common denominators and add.

7. $1\frac{2}{5} = 1 + \frac{\blacksquare}{20}$

$$+ 7\frac{1}{4} = 7 + \frac{\blacksquare}{20}$$

$$\blacksquare + \frac{\blacksquare}{20} = \blacksquare\frac{\blacksquare}{20}$$

8. $8\frac{1}{6} = 8 + \frac{1}{6}$

$$+ 1\frac{2}{3} = 1 + \frac{\blacksquare}{6}$$

$$\blacksquare + \frac{\blacksquare}{6} = \blacksquare\frac{\blacksquare}{6}$$

9. $4\frac{3}{4} + 2\frac{1}{8}$

10. $1\frac{1}{3} + 3\frac{2}{5}$

11. $3\frac{1}{2} + 4\frac{3}{10}$

12. $4\frac{1}{3} + 2\frac{7}{12}$

Subtract.

13. $7\frac{3}{4} - 5\frac{1}{6}$

14. $3\frac{5}{6} - 2\frac{3}{8}$

15. $3\frac{9}{10} - 1\frac{4}{5}$

16. $3\frac{2}{5} - 2\frac{3}{8}$

17. $5\frac{5}{8} - 2\frac{3}{8}$

18. $6\frac{3}{4} - 1\frac{2}{3}$

19. $3\frac{7}{10} - 1\frac{2}{5}$

20. $7\frac{3}{5} - 4\frac{1}{4}$

Ratios



Ratios are number comparisons.

This design has 20 squares.
6 are red and 14 are white.

The ratio of red squares to
all the squares is 6 to 20.

The ratio of white squares to
all the squares is 14 to 20.

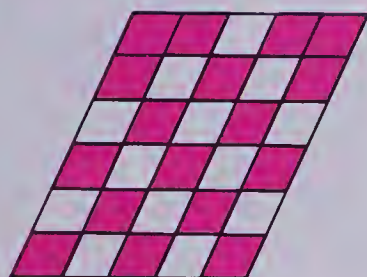
The ratio 6 to 20 can also be written as 6:20 or $\frac{6}{20}$.

The ratio 14 to 20 can also be written as 14:20 or $\frac{14}{20}$.



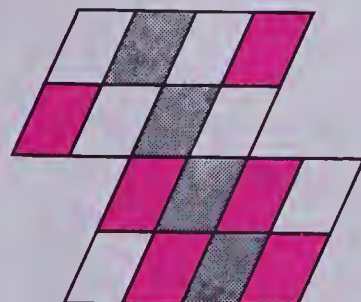
Exercises

1.



- How many diamond shapes are there?
- How many diamonds are red?
- How many diamonds are white?
- What is the ratio of red diamonds to all the diamonds?
- What is the ratio of white diamonds to all the diamonds?

2.



There are a total of 16  shapes.

- What is the ratio of the gray to the total number?
- What is the ratio of the red to the total number?
- What is the ratio of the white to the total number?

★ 3. Make up designs.

Use 2 or 3 colours and record the ratios in short statements.

Hockey Ratios

Name	Games Played	Goals	Assists	Points
Mike	24	30	14	44
Gerard	24	21	23	44
Norm	24	7	28	35
Sergio	24	18	10	28
Pierre	24	12	34	46

These are the hockey statistics for five players on the local bantam hockey team.

$$\text{Points} = \text{Goals} + \text{Assists}$$

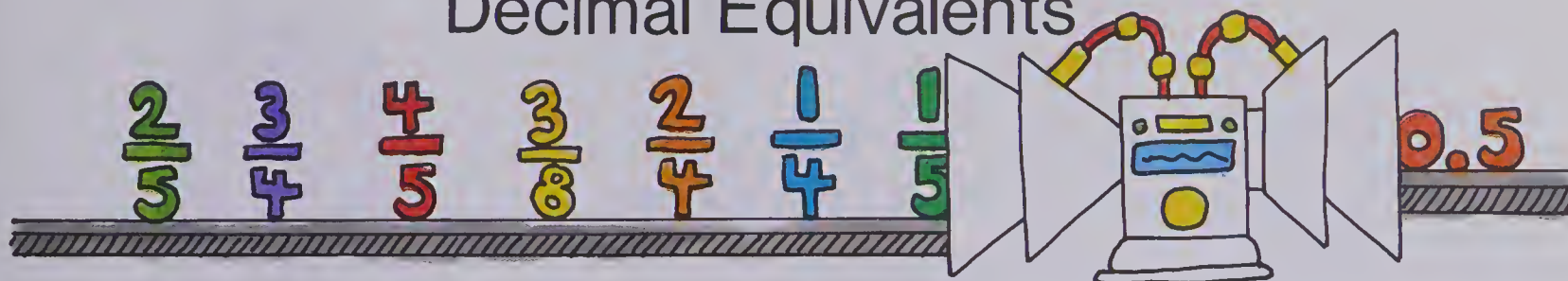
Exercises

Refer to the chart.

1. (a) List each player's goals to games ratio.
(b) Which player has the highest goals to games ratio?
2. (a) List each player's points to games ratio.
(b) Which player has the highest points to games ratio?
3. (a) List each player's assists to games ratio.
(b) Which player has the highest assists to games ratio?
4. (a) List each player's goals to points ratio.
★ (b) Which player has the highest goals to points ratio?
- ★ (c) Which player has the lowest goals to points ratio?
5. Which player do you think is the best player on this team? Why?
6. Gather some local hockey statistics and compare player's goal, assist, and point ratios.



Decimal Equivalents



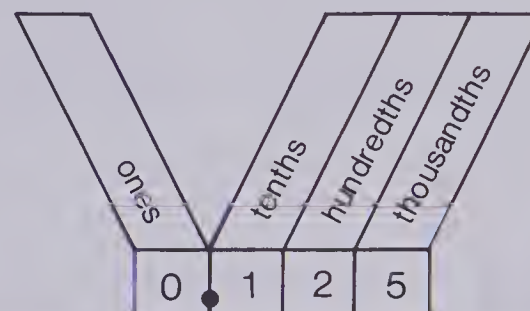
Any common fraction which can be expressed in tenths, hundredths, or thousandths can be changed to a decimal fraction.

Example $\frac{1}{2} = \frac{1 \times 5}{2 \times 5} = \frac{5}{10} = 0.5$

$$\frac{1}{4} = \frac{1 \times 25}{4 \times 25} = \frac{25}{100} = 0.25$$

$$\frac{1}{5} = \frac{1 \times 2}{5 \times 2} = \frac{2}{10} = 0.2$$

$$\frac{1}{8} = \frac{1 \times 125}{8 \times 125} = \frac{125}{1000} = 0.125$$



Exercises

Express each as a decimal fraction.

1. $\frac{3}{4} = \frac{3 \times \square}{4 \times \square} = \frac{\square}{100} = 0. \square \square$

2. $\frac{4}{5} = \frac{4 \times \square}{5 \times \square} = \frac{\square}{10} = 0. \square \square$

3. $\frac{3}{8} = \frac{3 \times \square}{8 \times \square} = \frac{\square}{1000} = 0. \square \square \square$

Hint:

$$5 \times 2 = 10$$

$$125 \times 8 = 1000$$

$$25 \times 4 = 100$$

$$20 \times 5 = 100$$

4. $\frac{1}{4}$

5. $\frac{3}{5}$

6. $\frac{7}{10}$

7. $\frac{2}{5}$

8. $\frac{3}{10}$

9. $\frac{1}{20}$

10. $\frac{7}{20}$

11. $\frac{11}{20}$

12. $\frac{13}{20}$

13. $\frac{19}{20}$

14. $\frac{1}{25}$

15. $\frac{4}{25}$

16. $\frac{9}{25}$

17. $\frac{19}{25}$

18. $\frac{24}{25}$

19. $\frac{5}{8}$

20. $\frac{7}{8}$

21. $\frac{5}{4}$

22. $\frac{7}{5}$

23. $\frac{13}{10}$

24. $\frac{19}{10}$

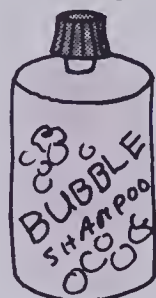
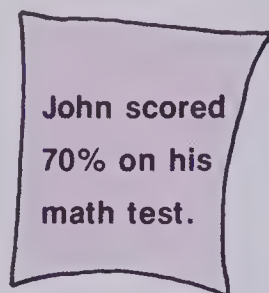
★ 25. $\frac{27}{20}$

★ 26. $\frac{35}{20}$

★ 27. $\frac{31}{25}$

★ 28. $\frac{50}{25}$

The Special Ratio



SPECIAL!
New size has
25% more!



A **percent** is an amount compared to 100. Percent means “per hundred”.

Susan achieved $\frac{66}{100}$ on a test.

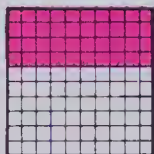
Her score is 66%.

Sam achieved $\frac{8}{10}$ on a test.

His score is $\frac{80}{100}$ or 80%.

Exercises

1.

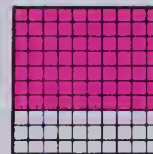


(a) What is the ratio
of red squares
to all the squares?

(b) What percent are
coloured red?

(c) What percent are white?

2.



(a) What is the ratio
of the red squares
to all of the squares?

(b) What percent are
red?

(c) What percent are white?

Change the following ratios to percents.

3. 65:100

4. 15:100

5. 25:100

6. $\frac{12}{100}$

7. $\frac{85}{100}$

8. $\frac{75}{100}$

Write each as a percent.

9. $\frac{4}{10} = \frac{4 \times 10}{10 \times 10} = \frac{40}{100} = \blacksquare\%$

10. $\frac{17}{50} = \frac{17 \times 2}{50 \times 2} = \frac{34}{100} = \blacksquare\%$

11. $\frac{7}{10} = \frac{\blacksquare}{100} = \blacksquare\%$

12. $\frac{35}{50} = \frac{\blacksquare}{100} = \blacksquare\%$

13. $\frac{1}{10} = \blacksquare\%$

14. $\frac{44}{50} = \blacksquare\%$

15. $\frac{6}{10} = \blacksquare\%$

16. $\frac{3}{50} = \blacksquare\%$

17. $\frac{29}{50} = \blacksquare\%$

18. $\frac{50}{50} = \blacksquare\%$

19. $\frac{9}{10} = \blacksquare\%$

20. $\frac{10}{10} = \blacksquare\%$

The % sign:

$\frac{\blacksquare}{100}$ becomes $\blacksquare / 100$ becomes $\blacksquare / 00$ becomes $\blacksquare\%$

Equivalent Ratios

In a hockey league, Rose had 12 points in 8 games played. Harold had 10 points in 7 games played.

The ratios of points to games were:

Rose: $\frac{12}{8}$ Harold: $\frac{10}{7}$

$$\begin{array}{l} \frac{12}{8} \text{ and } \frac{10}{7} \rightarrow 8 \times 10 = 80 \\ \frac{12}{8} \text{ and } \frac{10}{7} \rightarrow 12 \times 7 = 84 \end{array}$$

$$80 \neq 84$$

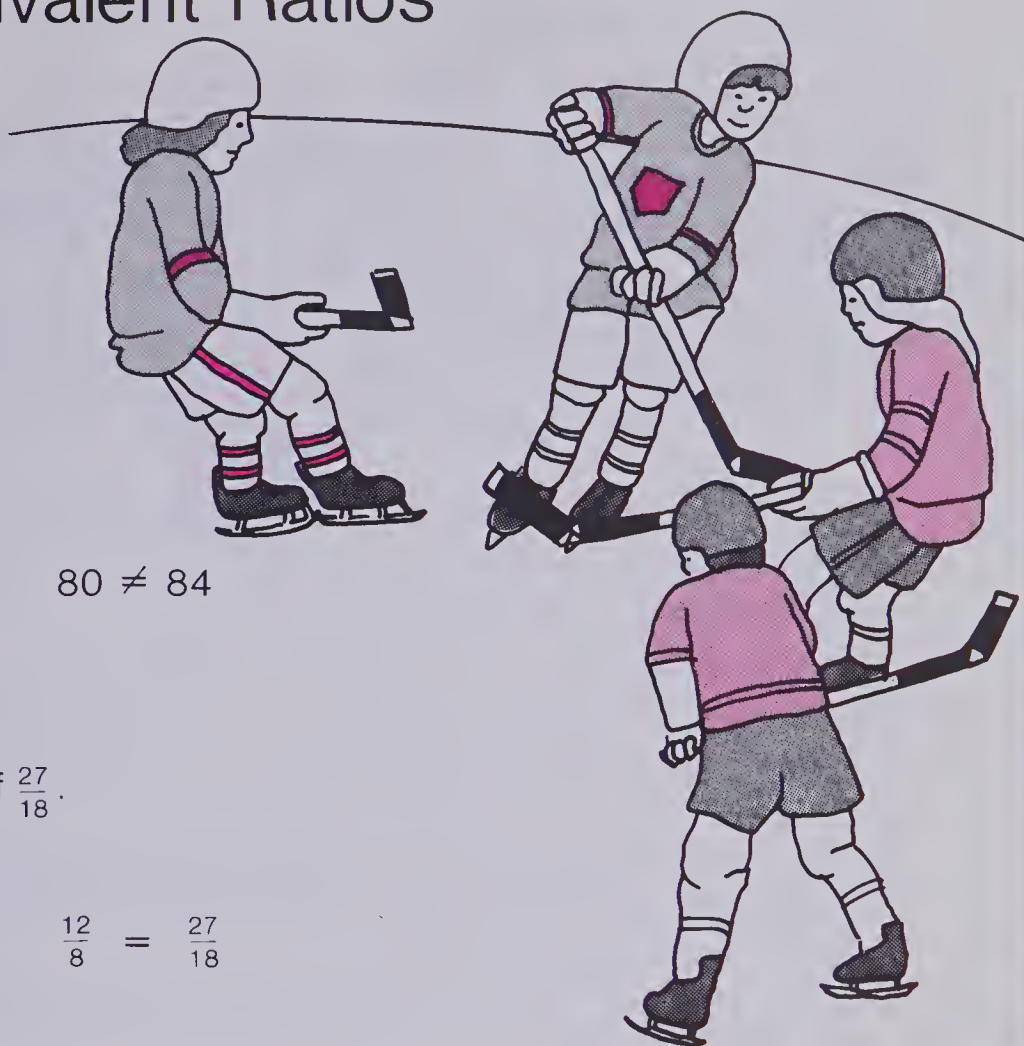
The ratios are not equivalent.

Randy had a ratio of points to games of $\frac{27}{18}$.
Is Randy's ratio equivalent to Rose's?

$$\begin{array}{l} \frac{12}{8} \text{ and } \frac{27}{18} \rightarrow 8 \times 27 = 216 \\ \frac{12}{8} \text{ and } \frac{27}{18} \rightarrow 12 \times 18 = 216 \end{array}$$

$$\frac{12}{8} = \frac{27}{18}$$

Their ratios are equivalent.



Exercises

Use cross products. Replace \bullet with $=$ or \neq .

1. $\frac{2}{5} \bullet \frac{8}{24}$ $\rightarrow 2 \times 8 = 16$
 $\rightarrow 5 \times 24 = 120$

$$\frac{2}{5} \bullet \frac{8}{24}$$

2. $\frac{7}{9} \bullet \frac{49}{63}$ $\rightarrow 7 \times 49 = 343$
 $\rightarrow 9 \times 63 = 567$

$$\frac{7}{9} \bullet \frac{49}{63}$$

3. $\frac{3}{5} \bullet \frac{6}{10}$

4. $\frac{4}{6} \bullet \frac{8}{12}$

5. $\frac{3}{7} \bullet \frac{10}{21}$

6. $\frac{7}{8} \bullet \frac{36}{40}$

7. $\frac{8}{12} \bullet \frac{4}{5}$

8. $\frac{17}{20} \bullet \frac{4}{5}$

9. $\frac{4}{12} \bullet \frac{5}{15}$

10. $\frac{3}{10} \bullet \frac{2}{6}$

Librarians



1. Mr. Toms ordered new books for the library. He ordered 42 books on sports, 26 books on animals, 32 books on history, and 54 books on fiction.
 - (a) How many books did he order in all?
 - (b) What is the ratio of sport books to fiction books ordered?
 - (c) What is the ratio of history books to fiction books ordered?
 - (d) What is the ratio of fiction books to total books ordered?
2. The ratio of books borrowed on Monday to total books borrowed for the week is $\frac{1}{10}$. The ratio of books borrowed on Saturday to total books borrowed for the week is $\frac{3}{12}$. Are the two ratios equivalent?
3. Ask the librarian in your school to help you fill this chart.

Number of Books Borrowed by Different Classes

Class	Monday	Tuesday	Wednesday	Thursday	Friday	Total
A						
B						
C						
.						
.						
.						

Draw a graph of the total books borrowed by the different classes.

The School Fair

At the "Ring Toss" booth Nina put 8 out of 25 rings on the target and José put 7 out of 20 rings on the target.

Who had the better "Ring Toss" percentage?



Nina

$$\frac{8}{25}$$

$$= \frac{8 \times \boxed{4}}{25 \times \boxed{4}}$$

$$= \frac{32}{100}$$

$$= 32\%$$

José

$$\frac{7}{20}$$

$$= \frac{7 \times \boxed{5}}{20 \times \boxed{5}}$$

$$= \frac{35}{100}$$

$$= 35\%$$

"Ring Toss" Ratio

"Ring Toss" Percentage

José had the better tossing percentage.

Exercises

Express each as a percent.

1. $\frac{1}{2} = \frac{1 \times 50}{2 \times 50} = \frac{\blacksquare}{100} = \blacksquare\%$

2. $\frac{3}{4} = \frac{3 \times \blacksquare}{4 \times \blacksquare} = \frac{\blacksquare}{100} = \blacksquare\%$

3. $\frac{4}{5}$

4. $\frac{3}{10}$

5. $\frac{1}{4}$

6. $\frac{13}{20}$

7. $\frac{7}{20}$

8. $\frac{2}{25}$

9. $\frac{17}{25}$

10. $\frac{21}{25}$

11. $\frac{1}{50}$

12. $\frac{8}{50}$

13. $\frac{45}{50}$

14. $\frac{9}{10}$

15. $\frac{3}{5}$

16. $\frac{9}{20}$

17. $\frac{3}{100}$

18. At the "Dart Throwing" booth Greg hit 7 stars with 25 darts and Brenda hit 3 stars with 10 darts.

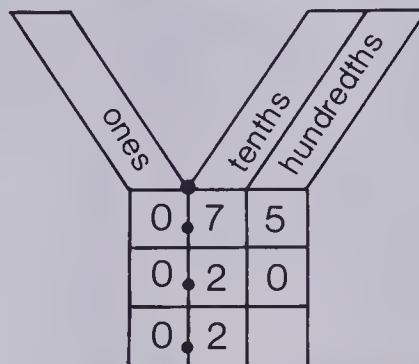
Who had the better dart throwing percentage?

Percents as Decimals

Percent is a comparison to 100.

Fractions with a denominator of 100 can be written as decimals.

$$75\% = \frac{75}{100} \\ = 0.75$$



$$20\% = \frac{20}{100}$$

$$= 0.20 \text{ or } 0.2$$

$$20\% = \frac{20}{100}$$

$$= \frac{2}{10}$$

$$= 0.2$$

Exercises

Express as decimals.

1. $25\% = \frac{\blacksquare}{100} = \blacksquare$

2. $16\% = \frac{\blacksquare}{100} = \blacksquare$

3. 45%

4. 50%

5. 80%

6. 10%

7. 67%

8. 35%

9. 72%

10. 99%

Solve.

11. Out of every dollar Julie earns she saves 15¢.
What percent does she save?

12. In a swimming class of 100 people, 42 are girls.
What percent are girls?

13. Mr. Johnson earns \$1000 per month and pays \$320 for rent.
(a) What percent of his salary does he pay in rent?
(b) What percent is used for other expenses?

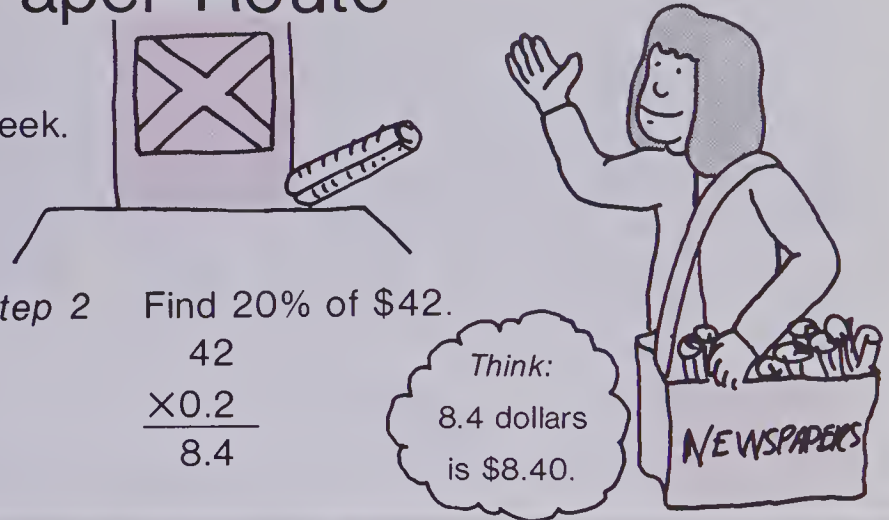
14. Mr. and Mrs. Johnson save \$12 for every \$100 earned.
(a) What percent do they save?
(b) What percent do they spend?

15. A basketball player tried to score 20 times in a game.
Nine shots were successful.
(a) What percent of the shots scored?
(b) What percent of the shots did not score?

16. An archer scored 17 bull's-eyes and 81 outer rings in 100 shots.
(a) What percent hit the bull's-eye?
(b) What percent hit the outer ring?
★(c) What percent missed the target?

Susan's Paper Route

Susan has a paper route.
She collects \$42 from her customers each week.
She keeps 20% of this amount.
How much does she earn per week?



Step 1 Change 20% to a decimal.
 $20\% = \frac{20}{100} = 0.20 = \boxed{0.2}$

Step 2 Find 20% of \$42.
$$\begin{array}{r} 42 \\ \times 0.2 \\ \hline 8.4 \end{array}$$

Think:
8.4 dollars
is \$8.40.

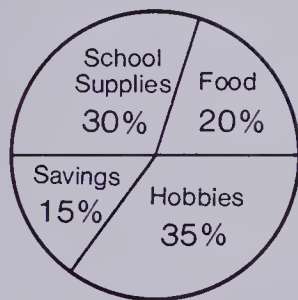
She earns \$8.40 per week.

Exercises

Calculate.

1. 10% of \$32
2. 50% of \$25
3. 20% of \$11
4. 60% of \$45
5. 70% of \$5
6. 90% of \$35
7. 80% of \$95
8. 30% of \$60
9. 10% of \$4
10. 30% of \$83

11.



John's Expenses

John receives an allowance of \$6.00 per week.

How much does he spend on:

- (a) school supplies?
- (b) food?
- (c) hobbies?
- (d) How much does he save each week?
- (e) Add all his spendings and savings. What is the sum?

12. 500 students attend Glenview Public School.

10% sing in the school choir.

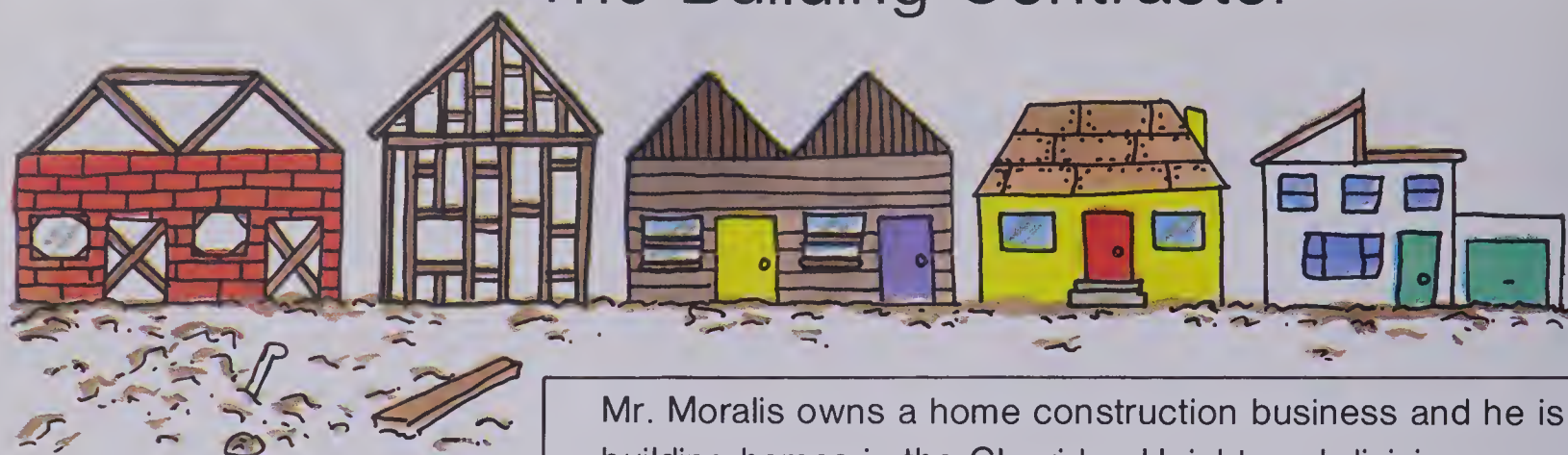
40% play intramural sports.

30% are members of the library club.

20% are members of the "Animal Kindness Club".

How many students participate in each of these school activities?

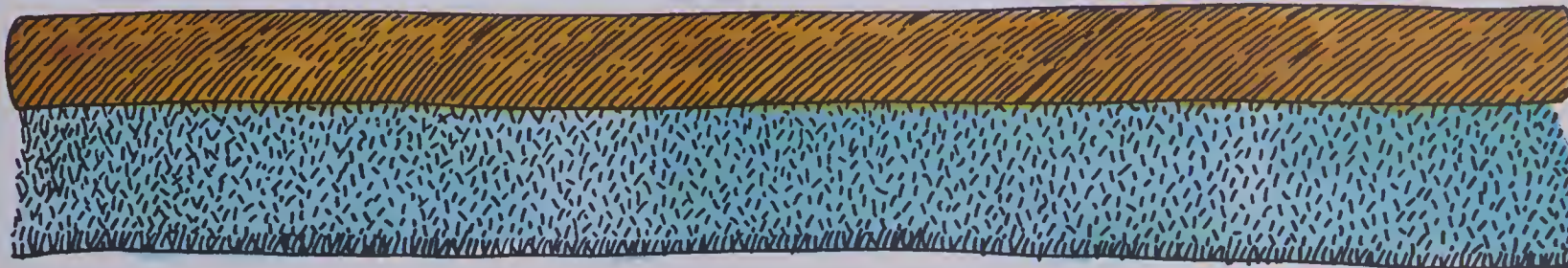
The Building Contractor



Mr. Moralis owns a home construction business and he is building homes in the Glenridge Heights subdivision.

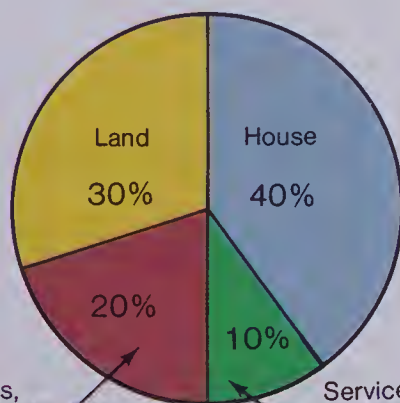
Exercises

1. The subdivision has 50 homes, 30 of which are semidetached and the rest are detached.
 - (a) What percent of the homes are semidetached?
 - (b) How many homes are detached homes?
 - (c) What percent of the homes are detached homes?
2. Of the 50 homes, 40% of the homes have 4 bedrooms, 50% have 3 bedrooms, and 10% have 2 bedrooms.
 - (a) How many homes have 4 bedrooms?
 - (b) How many homes have 3 bedrooms?
 - (c) How many homes have 2 bedrooms?
3. Of the 20 detached homes, 30% are being built with central air conditioning.
 - (a) How many homes have central air conditioning?
 - (b) How many homes do not have central air conditioning?
4. 27 of the 50 homes have 3 bathrooms and the rest have 2 bathrooms.
 - (a) What percent of the homes have 3 bathrooms?
 - (b) What percent of the homes have 2 bathrooms?



5. When all 50 homes were sold, 90% of the buyers selected wall-to-wall broadloom. The rest chose hardwood floors.
- (a) How many homes were carpeted?
 - (b) How many homes had hardwood floors?
6. After 3 months $\frac{4}{5}$ of the 50 homes were sold.
- (a) What percent of the homes were sold?
 - (b) How many homes were sold?
 - (c) How many were still for sale?
- ★ 7. The minimum down payment that the purchaser could make is 10% of the total price.
- (a) What is the minimum down payment allowed on a semidetached home which sells for \$60 000?
 - (b) What is the minimum down payment allowed on a single home which sells for \$85 000?
- ★ 8. The real estate company received \$4000 for selling a house valued at \$80 000. What percent of the selling price did they receive?

★ 9.



This circle graph shows the approximate costs which determine the selling price of a new home.

Calculate the cost of each for the contractor for the following sales.

- (a) A large 4 bedroom detached home selling for \$90 000.
- (b) A semidetached home selling for \$65 000.

Chapter Test

What fraction is shaded?



3. Solve.

$$\frac{3}{5} \text{ of } 20 = \blacksquare$$

Which pairs of fractions are equivalent fractions?

4. $\frac{2}{3}$ and $\frac{5}{6}$

5. $\frac{8}{9}$ and $\frac{16}{18}$

6. $\frac{7}{8}$ and $\frac{6}{7}$

Make these equivalent fractions.

7. $\frac{1}{3} = \frac{\blacksquare}{15}$

8. $\frac{2}{5} = \frac{\blacksquare}{20}$

9. $\frac{5}{8} = \frac{\blacksquare}{40}$

10. $\frac{5}{4} = \frac{\blacksquare}{16}$

Add or subtract as indicated.

11. $\frac{1}{10} + \frac{7}{10}$

12. $\frac{1}{4} + \frac{2}{5}$

13. $\frac{5}{8} - \frac{3}{8}$

14. $\frac{1}{2} - \frac{3}{10}$

15. $3\frac{7}{10} + 2\frac{1}{10}$

16. $5\frac{3}{4} - 3\frac{1}{3}$

17. $0.7 + 0.2 + 0.9$

18. $7.937 + 2.715$

19. $18.72 - 5.16$

Express each as a percent.

20. $\frac{39}{100}$

21. $\frac{4}{5}$

22. $\frac{11}{25}$

23. $\frac{40}{50}$

Write as decimals.

24. $\frac{87}{100}$

25. $\frac{11}{25}$

26. 32%

27. 80%

Write as a fraction.

28. 0.8

29. 0.19

30. 1.3

31. 0.411

Find.

32. 20% of 60

33. 80% of 150

34. 30% of \$25

35. 40% of \$30

36. John achieved $\frac{16}{20}$ on a math test.

What percentage mark would he receive?

37. Joan bought new skates for 80% of the regular price. The regular price was \$24.

What price did she pay?

Cumulative Review

Perform the indicated operations.

$$\begin{array}{r} 1. \quad 17\,327 \\ \quad 5\,283 \\ + \quad 309 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 12.07 \\ \quad - 5.83 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad \$63.09 \\ \quad \times \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 49.6 \\ \quad \times 0.4 \\ \hline \end{array}$$

$$5. \quad 42 \overline{)2352}$$

$$6. \quad \frac{5}{10} + \frac{3}{10}$$

$$7. \quad \begin{array}{r} \frac{3}{4} \\ - \frac{2}{5} \\ \hline \end{array}$$

$$8. \quad \begin{array}{r} \frac{5}{8} \\ + \frac{1}{3} \\ \hline \end{array}$$

$$9. \quad \begin{array}{r} 3\frac{1}{2} \\ + 4\frac{1}{10} \\ \hline \end{array}$$

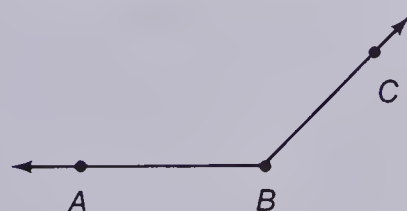
$$10. \quad 20 \times 90$$

$$11. \quad 35 \times 100$$

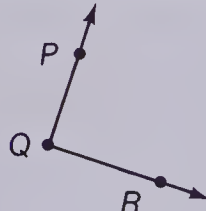
$$12. \quad 750 \div 100$$

13. State whether each angle is acute, right, or obtuse.

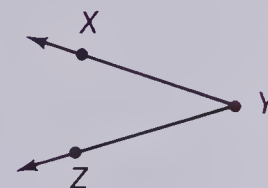
(a)



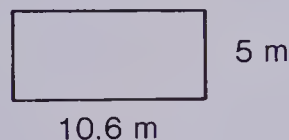
(b)



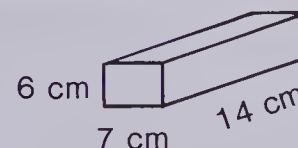
(c)



14. Calculate the area.



15. Calculate the volume.



16. Solve.

(a) $37 - 15 = N$

(b) $50 \div N = 10$

(c) $N + 12 = 58$

17. Find the greatest common factor for each pair of numbers.

(a) 8 and 14

(b) 16 and 20

(c) 6 and 24

18. Solve.

(a) What is the radius of a circle whose diameter is 10 cm?

(b) A square has sides 15 cm long. What is the perimeter in centimetres of this square?

Express each as a fraction out of 100 and then as a percent.

19. $\frac{3}{5}$

20. $\frac{8}{10}$

21. $\frac{11}{20}$

22. $\frac{37}{50}$

Find.

23. 40% of 80

24. 10% of 30

25. 80% of \$50

26. 20% of \$120

Chapter 9

Computation

Multiplication and Division

Average

Circle Graphs



Space Probes

Be a Probe Pilot!

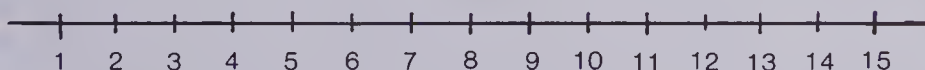
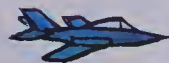
Where are you on the Probe Profiles?



MARS PROBE

- | | | | | |
|--|--|--|--|--|
| 1. $\begin{array}{r} 24 \\ +35 \\ \hline \end{array}$ | 2. $\begin{array}{r} 0.72 \\ +0.26 \\ \hline \end{array}$ | 3. $\begin{array}{r} 408 \\ +361 \\ \hline \end{array}$ | 4. $\begin{array}{r} 52.30 \\ +37.06 \\ \hline \end{array}$ | 5. $\begin{array}{r} 7024 \\ +1603 \\ \hline \end{array}$ |
| 6. $\begin{array}{r} 37 \\ +56 \\ \hline \end{array}$ | 7. $\begin{array}{r} 0.49 \\ +1.73 \\ \hline \end{array}$ | 8. $\begin{array}{r} 825 \\ +409 \\ \hline \end{array}$ | 9. $\begin{array}{r} 7.04 \\ +3.98 \\ \hline \end{array}$ | 10. $\begin{array}{r} 4392 \\ +4718 \\ \hline \end{array}$ |
| 11. $\begin{array}{r} 237.6 \\ +687.9 \\ \hline \end{array}$ | 12. $\begin{array}{r} 82\ 056 \\ +39\ 286 \\ \hline \end{array}$ | 13. $\begin{array}{r} \$525.89 \\ +\ 768.54 \\ \hline \end{array}$ | 14. $\begin{array}{r} 207\ 468 \\ +384\ 908 \\ \hline \end{array}$ | 15. $\begin{array}{r} 9263.77 \\ +8371.55 \\ \hline \end{array}$ |

On a graph like this, graph your Mars Probe Profile.



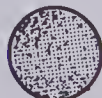
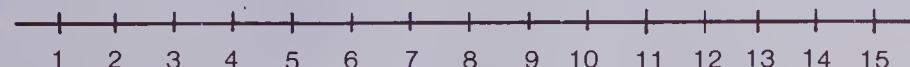
Probe Score

	/	15
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JUPITER PROBE

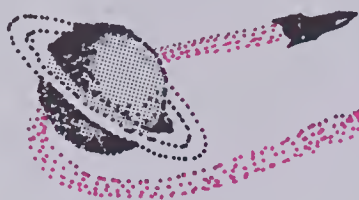
- | | | | | |
|--|--|--|--|---|
| 1. $\begin{array}{r} .75 \\ -30 \\ \hline \end{array}$ | 2. $\begin{array}{r} 468 \\ -237 \\ \hline \end{array}$ | 3. $\begin{array}{r} 0.93 \\ -0.51 \\ \hline \end{array}$ | 4. $\begin{array}{r} 67.95 \\ -53.04 \\ \hline \end{array}$ | 5. $\begin{array}{r} 9758 \\ -6023 \\ \hline \end{array}$ |
| 6. $\begin{array}{r} 60 \\ -28 \\ \hline \end{array}$ | 7. $\begin{array}{r} 3.05 \\ -1.29 \\ \hline \end{array}$ | 8. $\begin{array}{r} 800 \\ -539 \\ \hline \end{array}$ | 9. $\begin{array}{r} 9.04 \\ -2.67 \\ \hline \end{array}$ | 10. $\begin{array}{r} 7003 \\ -5286 \\ \hline \end{array}$ |
| 11. $\begin{array}{r} \$73.24 \\ -\ 36.86 \\ \hline \end{array}$ | 12. $\begin{array}{r} 81\ 052 \\ -47\ 269 \\ \hline \end{array}$ | 13. $\begin{array}{r} 63.47 \\ -54.87 \\ \hline \end{array}$ | 14. $\begin{array}{r} 351\ 641 \\ -172\ 583 \\ \hline \end{array}$ | 15. $\begin{array}{r} 435\ 170 \\ -\ 76\ 281 \\ \hline \end{array}$ |

On a graph like this, graph your Jupiter Probe Profile.



Probe Score

	/	15
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SATURN PROBE

1. 36×10 2. 100×27 3. 100×10 4. 400×50 5. 300×600

6. $\begin{array}{r} 40 \\ \times 7 \\ \hline \end{array}$ 7. $\begin{array}{r} 56 \\ \times 8 \\ \hline \end{array}$ 8. $\begin{array}{r} \$4.07 \\ \times 9 \\ \hline \end{array}$ 9. $\begin{array}{r} 720 \\ \times 6 \\ \hline \end{array}$ 10. $\begin{array}{r} 358 \\ \times 5 \\ \hline \end{array}$

11. $\begin{array}{r} 3460 \\ \times 7 \\ \hline \end{array}$ 12. $\begin{array}{r} \$29.95 \\ \times 6 \\ \hline \end{array}$ 13. $\begin{array}{r} 73\,024 \\ \times 5 \\ \hline \end{array}$ 14. $\begin{array}{r} 61\,450 \\ \times 7 \\ \hline \end{array}$ 15. $\begin{array}{r} 83\,177 \\ \times 8 \\ \hline \end{array}$

16. $\begin{array}{r} 47 \\ \times 20 \\ \hline \end{array}$ 17. $\begin{array}{r} 60 \\ \times 37 \\ \hline \end{array}$ 18. $\begin{array}{r} 84 \\ \times 65 \\ \hline \end{array}$ 19. $\begin{array}{r} 73 \\ \times 44 \\ \hline \end{array}$ 20. $\begin{array}{r} 68 \\ \times 56 \\ \hline \end{array}$

21. $\begin{array}{r} 136 \\ \times 40 \\ \hline \end{array}$ 22. $\begin{array}{r} 620 \\ \times 39 \\ \hline \end{array}$ 23. $\begin{array}{r} 407 \\ \times 34 \\ \hline \end{array}$ 24. $\begin{array}{r} 524 \\ \times 65 \\ \hline \end{array}$ 25. $\begin{array}{r} 736 \\ \times 72 \\ \hline \end{array}$

26. $\begin{array}{r} 76 \\ \times 0.8 \\ \hline \end{array}$ 27. $\begin{array}{r} 245 \\ \times 0.3 \\ \hline \end{array}$ 28. $\begin{array}{r} 2074 \\ \times 0.6 \\ \hline \end{array}$ 29. $\begin{array}{r} 18.6 \\ \times 0.9 \\ \hline \end{array}$ 30. $\begin{array}{r} 4.38 \\ \times 0.7 \\ \hline \end{array}$

On a graph like this, graph your Saturn Probe Profile.



Probe Score

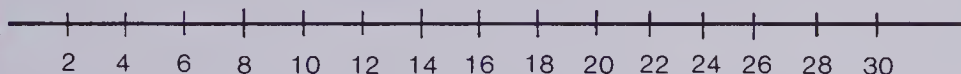
	/	30
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NEPTUNE PROBE

Some have remainders!

1. $7 \overline{)86}$
2. $6 \overline{)78}$
3. $8 \overline{)349}$
4. $7 \overline{)252}$
5. $5 \overline{)337}$
6. $4 \overline{)964}$
7. $3 \overline{)952}$
8. $5 \overline{)675}$
9. $6 \overline{)2172}$
10. $7 \overline{)2977}$
11. $23 \overline{)161}$
12. $41 \overline{)315}$
13. $15 \overline{)135}$
14. $20 \overline{)160}$
15. $32 \overline{)259}$
16. $24 \overline{)384}$
17. $31 \overline{)817}$
18. $12 \overline{)444}$
19. $40 \overline{)640}$
20. $52 \overline{)975}$
21. $28 \overline{)980}$
22. $24 \overline{)912}$
23. $57 \overline{)2622}$
24. $73 \overline{)2117}$
25. $35 \overline{)2275}$
26. $3 \overline{)1824}$
27. $9 \overline{)3645}$
28. $6 \overline{)4824}$
29. $5 \overline{)2515}$
30. $8 \overline{)5624}$

On a graph like this, graph your Neptune Probe Profile.



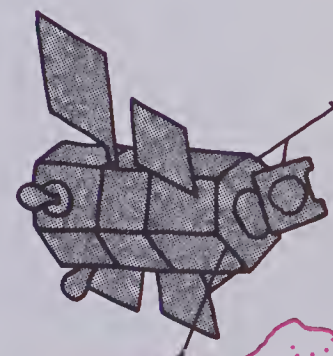
Probe Score

	30
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Galactic Star Rating

Find your total Probe Scores.

Bronze Star	Copper Star	Silver Star	Gold Star	Diamond Star
41-50 points	51-60 points	61-70 points	71-80 points	81-90 points



Morning's Catch

Fishermen on the trawler "Debbie II" caught 583 cod and 237 salmon.



About how many fish altogether?

About how many more cod than salmon?

Estimate:

$$\begin{array}{r} 600 \\ +200 \\ \hline 800 \end{array}$$

Calculate:

$$\begin{array}{r} 583 \\ +237 \\ \hline 820 \end{array}$$

Estimate:

$$\begin{array}{r} 600 \\ -200 \\ \hline 400 \end{array}$$

Calculate:

$$\begin{array}{r} 583 \\ -237 \\ \hline 346 \end{array}$$

An **estimate** tells us whether or not our written answer is reasonable.

Exercises

Record your estimate first, then calculate these catches.

1.
$$\begin{array}{r} 871 \\ +240 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 121 \\ +485 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 506 \\ +297 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 350 \\ +280 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 427 \\ +318 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 918 \\ +358 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 480 \\ +280 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 715 \\ +446 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 308 \\ +375 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 635 \\ +486 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 619 \\ -273 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 895 \\ -339 \\ \hline \end{array}$$

13.
$$\begin{array}{r} 703 \\ -517 \\ \hline \end{array}$$

14.
$$\begin{array}{r} 690 \\ -180 \\ \hline \end{array}$$

15.
$$\begin{array}{r} 548 \\ -273 \\ \hline \end{array}$$

16.
$$\begin{array}{r} 488 \\ -409 \\ \hline \end{array}$$

17.
$$\begin{array}{r} 550 \\ -207 \\ \hline \end{array}$$

18.
$$\begin{array}{r} 623 \\ -197 \\ \hline \end{array}$$

19.
$$\begin{array}{r} 792 \\ -356 \\ \hline \end{array}$$

20.
$$\begin{array}{r} 619 \\ -349 \\ \hline \end{array}$$

★ 21.
$$\begin{array}{r} 999 \\ +555 \\ \hline \end{array}$$

★ 22.
$$\begin{array}{r} 4720 \\ + 444 \\ \hline \end{array}$$

★ 23.
$$\begin{array}{r} 1347 \\ - 599 \\ \hline \end{array}$$

★ 24.
$$\begin{array}{r} 2222 \\ - 999 \\ \hline \end{array}$$

★ 25.
$$\begin{array}{r} 1010 \\ - 101 \\ \hline \end{array}$$

The Fishermen

The fishing boat *Albatross* has travelled 3895 km.
The *Argosy* has travelled 6247 km.
How many more kilometres has the *Argosy* travelled?

Estimate:

$$\begin{array}{r} 6000 \\ -4000 \\ \hline 2000 \end{array}$$

About 2000 km farther.

Calculate:

$$\begin{array}{r} 6247 \\ -3895 \\ \hline 2352 \end{array}$$

2352 km farther.



Exercises

Estimate first, then calculate.

- The captain of the *Westwood* bought 385 m of rope to repair some nets.
Later, he bought 224 m of rope.

About how many metres of rope did he buy? (Estimate.)

How many metres of rope did he buy? (Calculate.)

- The fishing trawler *Easton* has sold \$5224 worth of fish.

The *Randolph* has sold \$7685 worth of fish.

About how much more money has the *Randolph* made? (Estimate.)

How much more has the *Randolph* made? (Calculate.)

- The captain of the *Woburn II* spent \$479.35 to repair the engine and \$237.18 to repair the rudder.

About how much was the total cost of repairs? (Estimate.)

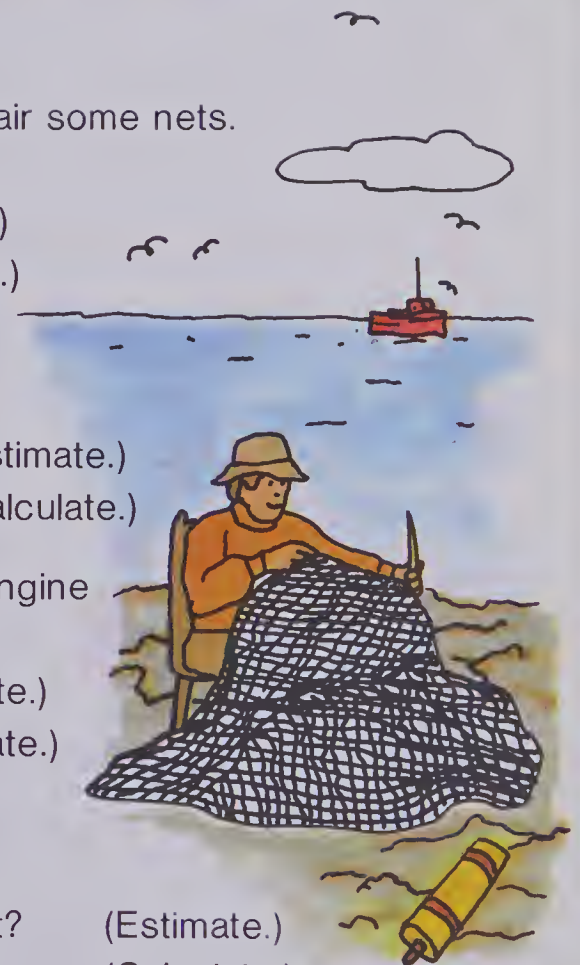
How much was the total cost of repairs? (Calculate.)

- One fishing fleet caught 62 t of fish.

Another fleet caught 37 t.

About how many more tonnes were caught by the first fleet? (Estimate.)

How many more tonnes were caught by the first fleet? (Calculate.)



In the Ball Park

$$63 \times 27$$

Is your product
in the ball park?

Round down.
 $60 \times 20 = 1200$

Round up.
 $70 \times 30 = 2100$

My
answer is
between
1200 and 2100.
 $63 \times 27 = 1701$

Rounding down
and up gives us
helpful limits
when we estimate
products.

Calculated answers
within the limits
are said to be
“in the ball park”.

Exercises

Round down and up for limits, then calculate.

Are your products in the ball park?

1. Down

$$47 \times 32$$

Up

2. Down

$$81 \times 75$$

Up

3. Down

$$58 \times 67$$

Up

4. 72
 $\times 46$
—

5. 85
 $\times 53$
—

6. 66
 $\times 71$
—

7. 49
 $\times 36$
—

8. 92
 $\times 27$
—

9. 33
 $\times 22$
—

10. 75
 $\times 55$
—

11. 84
 $\times 37$
—

12. 99
 $\times 25$
—

13. 55
 $\times 30$
—

14. 29
 $\times 29$
—

15. 90
 $\times 90$
—

The Ball Game

Baseball fans from Rockford were brought to the game in 7 buses.

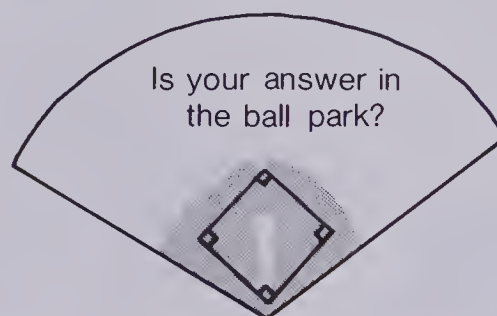
Each bus carried 46 passengers.

How many fans from Rockford attended the game?

Estimate:

Round up $7 \times 50 = 350$

Round down $7 \times 40 = 280$



Calculate:

46

$\times 7$

322

Between 280 and 350 fans.

322 Rockford fans attended.

Exercises

Estimate first, then calculate.

1. The ball park has 6 banks of lights for night games.

There are 16 lights in each bank.

About how many lights altogether? (Estimate.)

How many lights altogether? (Calculate.)

2. The electronic score board has 88 columns of lights across with 73 lights in each column.

About how many lights altogether? (Estimate.)

How many lights altogether? (Calculate.)

3. There are 7 popcorn machines in the ball park.

Each machine prepares 165 boxes of popcorn before a game.

About how many boxes of popcorn are prepared? (Estimate.)

How many boxes of popcorn are prepared? (Calculate.)

4. 85 boxes of potato chips were ordered.

Each box contained 36 bags.

About how many bags of potato chips were ordered? (Estimate.)

How many bags of potato chips were ordered? (Calculate.)

5. On the average, 6830 people attend each game.

About how many people in total would attend 5 games? (Estimate.)

How many people in total would attend 5 games? (Calculate.)



Mental Magic

Lee uses long division.

Step 1

$$\begin{array}{r} 1 \\ 4 \overline{) 68} \\ \underline{4} \\ 28 \end{array}$$

Step 2

$$\begin{array}{r} 17 \\ 4 \overline{) 68} \\ \underline{4} \\ 28 \\ \underline{28} \\ 0 \end{array}$$

$$4 \overline{) 68}$$

Sara uses short division.

$$\begin{array}{r} 1 \\ 4 \overline{) 6^2 8} \end{array}$$

$$\begin{array}{r} 17 \\ 4 \overline{) 6^2 8} \end{array}$$

20 is represented by 2

Think:

$$\begin{array}{r} 7 \\ 4 \overline{) 28} \end{array}$$



Mental work
can make
division easier!

Exercises

Complete these long and short division examples.

1.

$$\begin{array}{r} 1 \square \\ 5 \overline{) 70} \\ \underline{5} \\ 2 \square \\ \underline{\square \square} \\ \square \end{array}$$

$$\begin{array}{r} 1 \square \\ 5 \overline{) 7^2 0} \end{array}$$

2.

$$\begin{array}{r} 2 \square \\ 7 \overline{) 175} \\ \underline{14} \\ 3 \square \\ \underline{\square \square} \\ \square \end{array}$$

$$\begin{array}{r} 2 \square \\ 7 \overline{) 17^5} \end{array}$$

Divide. Use short division.

3. $6 \overline{) 72}$

4. $4 \overline{) 124}$

5. $3 \overline{) 78}$

6. $9 \overline{) 135}$

7. $7 \overline{) 126}$

8. $8 \overline{) 96}$

9. $4 \overline{) 52}$

10. $7 \overline{) 224}$

11. $5 \overline{) 200}$

12. $2 \overline{) 166}$

13. $3 \overline{) 81}$

14. $8 \overline{) 504}$

15. $9 \overline{) 630}$

16. $4 \overline{) 380}$

17. $7 \overline{) 91}$

18. $3 \overline{) 105}$

19. $8 \overline{) 216}$

20. $9 \overline{) 324}$

21. $2 \overline{) 76}$

22. $6 \overline{) 522}$

More Mental Magic

Long Division

$$\begin{array}{r} 127 \frac{4}{5} \\ 5 \overline{)639} \\ \underline{5} \\ 13 \\ \underline{10} \\ 39 \\ \underline{35} \\ 4 \end{array}$$

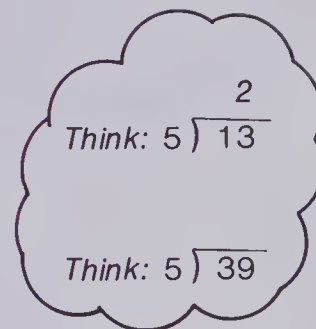
Remainder $\frac{4}{5}$
Divisor

Short Division

$$\begin{array}{r} 127 \frac{4}{5} \\ 5 \overline{)6139} \end{array}$$

Remainder $\frac{4}{5}$
Divisor

100 is represented by 1.
30 is represented by 3.



Sometimes the remainder is expressed as a fraction.

Exercises

Complete these long and short division examples.

$$\begin{array}{r} 1 \blacksquare \blacksquare \text{ R} \blacksquare \\ 3 \overline{)527} \\ \underline{3} \\ 2 \blacksquare \\ \underline{} \\ \blacksquare \blacksquare \\ \underline{} \\ \blacksquare \blacksquare \\ \underline{} \\ \blacksquare \end{array}$$

$$\begin{array}{r} 1 \blacksquare \blacksquare \text{ R} \blacksquare \\ 3 \overline{)5 \blacksquare 2 \blacksquare 7} \end{array}$$

$$\begin{array}{r} 2 \blacksquare \blacksquare \\ 6 \overline{)1422} \\ \underline{12} \\ \blacksquare \blacksquare \\ \underline{} \\ \blacksquare \blacksquare \\ \underline{} \\ \blacksquare \blacksquare \\ \underline{} \\ \blacksquare \end{array}$$

$$\begin{array}{r} 2 \blacksquare \blacksquare \\ 6 \overline{)14 \blacksquare 2 \blacksquare 2} \end{array}$$

Divide using short division. Some have remainders.

$$3. \quad 4 \overline{)504}$$

$$4. \quad 6 \overline{)1662}$$

$$5. \quad 7 \overline{)942}$$

$$6. \quad 3 \overline{)453}$$

$$7. \quad 8 \overline{)929}$$

$$8. \quad 5 \overline{)685}$$

$$9. \quad 3 \overline{)651}$$

$$10. \quad 2 \overline{)886}$$

$$11. \quad 4 \overline{)2130}$$

$$12. \quad 9 \overline{)2268}$$

$$13. \quad 7 \overline{)1030}$$

$$14. \quad 5 \overline{)1305}$$

Divide. Express remainders as fractions.

$$15. \quad 6 \overline{)849}$$

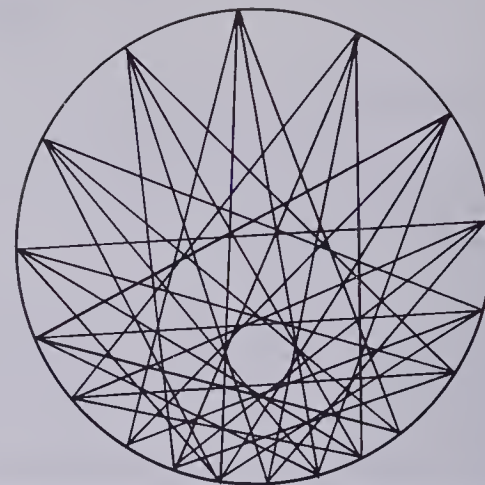
$$\star 16. \quad 4 \overline{)812}$$

$$\star 17. \quad 8 \overline{)4845}$$

$$\star 18. \quad 5 \overline{)505}$$

String Art

Richard and Theresa make interesting designs with string art!
They used 3.2 m of green string.
Theresa cut it into 4 equal pieces.
How long is each piece?



$$\begin{array}{r} 0.8 \\ 4 \overline{) 3.2} \end{array}$$

Check:

$$\begin{array}{r} 0.8 \\ \times 4 \\ \hline 3.2 \end{array}$$

Each piece is 0.8 m long.

Exercises

Divide. Check by multiplication.

1. $5 \overline{) 3.5}$

2. $6 \overline{) 4.8}$

3. $4 \overline{) 1.6}$

4. $3 \overline{) 2.7}$

5. $6 \overline{) 4.2}$

6. $7 \overline{) 5.6}$

7. $5 \overline{) 2.0}$

8. $4 \overline{) 2.4}$

9. $7 \overline{) 2.8}$

10. $3 \overline{) 1.8}$

Divide. Check by multiplication.

11. $4 \overline{) 7.2}$

Check:

$$\begin{array}{r} 1.8 \\ \times 4 \\ \hline 7.2 \end{array}$$

12. $3 \overline{) 8.4}$

13. $5 \overline{) 11.5}$

14. $7 \overline{) 16.1}$

15. $3 \overline{) 7.8}$

16. $6 \overline{) 9.0}$

17. $9 \overline{) 32.4}$

18. $4 \overline{) 10.4}$

19. $5 \overline{) 8.0}$

20. $8 \overline{) 9.6}$

21. $7 \overline{) 24.5}$

22. $6 \overline{) 11.4}$

Solve.

Wall String Designs

23. The board for this design is square.

Perimeter is 5.2 m.

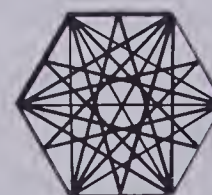
How long is each side?



24. 6-sided design.

Perimeter is 4.8 m.

How long is each side?



Rainy Recess Games

Brent's Grade 5 class collected money to buy "Rainy Recess" games.

They collected \$63.84.

They bought 8 different games each for the same price.

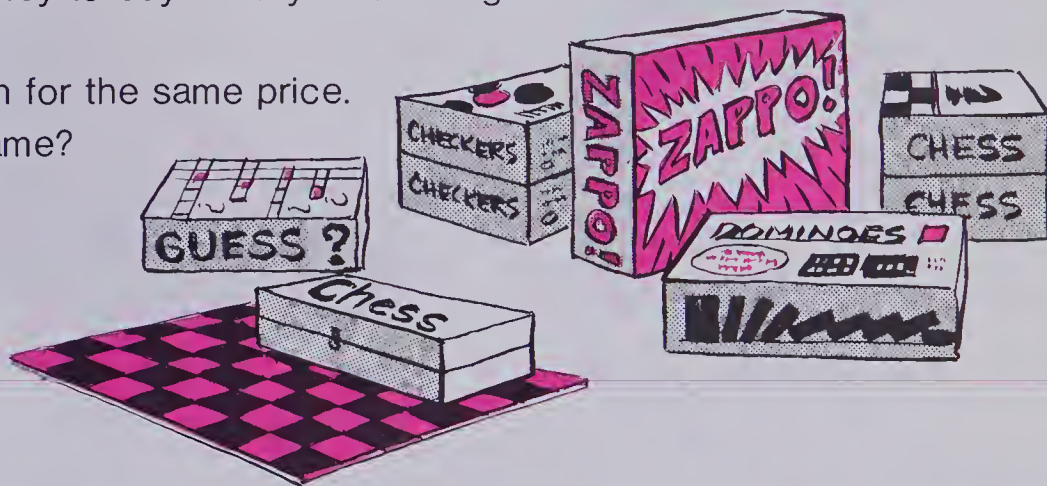
How much did they pay for each game?

$$\begin{array}{r} 7.98 \\ 8 \overline{) 63.84} \end{array}$$

Check:

$$\begin{array}{r} 7.98 \\ \times 8 \\ \hline \end{array}$$

63.84



The price of each game is \$7.98.

Exercises

Divide.

1. $4 \overline{) 13.08}$

2. $7 \overline{) 13.65}$

3. $6 \overline{) 25.56}$

4. $3 \overline{) 12.51}$

5. $8 \overline{) 25.92}$

6. $4 \overline{) 12.72}$

7. $3 \overline{) 12.87}$

8. $9 \overline{) 21.69}$

9. $2 \overline{) 10.58}$

10. $5 \overline{) 17.90}$

11. $6 \overline{) 26.52}$

12. $4 \overline{) 20.12}$

13. $7 \overline{) 13.86}$

14. $9 \overline{) 13.77}$

15. $3 \overline{) 18.54}$

16. $8 \overline{) 24.72}$

Solve.

17. 3 chess games.
\$14.85 altogether.
How much for each game?



18. 5 boxes of checker men.
\$8.95 altogether.
How much for each box?



Write each quotient to complete the patterns. What rule helps you place the decimal point?

19. $3 \overline{) 26}$, $3 \overline{) ?}$, $3 \overline{) 0.78}$

20. $4 \overline{) 147}$, $4 \overline{) 58.8}$, $4 \overline{) 5.88}$

★ 21. $6 \overline{) 427}$, $6 \overline{) 256.2}$, $6 \overline{) 25.62}$, $6 \overline{) 2.562}$

★ 22. $5 \overline{) ?}$, $5 \overline{) 106.0}$, $5 \overline{) 10.60}$, $5 \overline{) 1.060}$

Irrigation

Mr. Jackson is cutting irrigation pipes for his field.

16.8 m of irrigation pipe.

He cut it into 24 equal pieces.

How long is each piece?

$$\begin{array}{r} 0.7 \\ 24 \overline{) 16.8} \\ \underline{16\ 8} \\ 0 \end{array}$$

Check:

24

$\times 0.7$

$\underline{16.8}$



Each piece is 0.7 m long.

Exercises

Divide.

1. $31 \overline{) 15.5}$

2. $23 \overline{) 18.4}$

3. $45 \overline{) 27.0}$

4. $26 \overline{) 15.6}$

5. $38 \overline{) 15.2}$

6. $21 \overline{) 14.7}$

7. $52 \overline{) 41.6}$

8. $30 \overline{) 21.0}$

9. $65 \overline{) 39.0}$

10. $29 \overline{) 17.4}$

11. $47 \overline{) 18.8}$

12. $38 \overline{) 30.4}$

Divide.

13. $22 \overline{) 74.8}$

Check:

3.4

$\times 22$

$\underline{68}$

$\underline{68}$

$\underline{74.8}$

14. $35 \overline{) 80.5}$

15. $41 \overline{) 147.6}$

16. $27 \overline{) 83.7}$

17. $34 \overline{) 88.4}$

18. $46 \overline{) 78.2}$

19. $16 \overline{) 54.4}$

20. $29 \overline{) 139.2}$

21. $53 \overline{) 243.8}$

22. $36 \overline{) 126.0}$

23. $22 \overline{) 101.2}$

24. $18 \overline{) 55.8}$

25. $56 \overline{) 84.0}$

26. $28 \overline{) 109.2}$

27. $41 \overline{) 147.6}$

Solve.

28. Sprinkler Pipes.

28.0 m of pipe.

It is cut into 35 equal pieces.

How long is each piece?

29. Overflow Pipes.

43.2 m of pipe.

It is cut into 27 equal pieces.

How long is each piece?

T-Shirts

27 students in the Camera Club bought T-Shirts.

Total cost was \$93.15.

What was the cost of each T-Shirt?

$$\begin{array}{r} 3.45 \\ 27 \overline{) 93.15} \\ \underline{81} \\ 121 \\ \underline{108} \\ 135 \\ \underline{135} \\ 0 \end{array}$$



The cost of each T-Shirt was \$3.45.

Exercises

Divide.

1. $32 \overline{) 63.36}$
2. $25 \overline{) 53.75}$
3. $19 \overline{) 46.17}$
4. $21 \overline{) 66.15}$
5. $41 \overline{) 52.89}$
6. $34 \overline{) 73.10}$
7. $31 \overline{) 94.55}$
8. $26 \overline{) 89.70}$
9. $27 \overline{) 64.53}$
10. $15 \overline{) 70.20}$
11. $53 \overline{) 89.04}$
12. $31 \overline{) 67.89}$
13. $46 \overline{) 93.38}$
14. $28 \overline{) 92.12}$
15. $20 \overline{) 47.80}$

16. School Choir.

21 members bought T-Shirts.

Total cost was \$61.95.

How much for each T-Shirt?



17. Fitness Club.

28 members bought T-Shirts.

Total cost was \$89.32.

How much for each T-Shirt?



Write each quotient to complete the patterns.

$$18. \quad \begin{array}{r} 36 \\ 27 \overline{) 972} \end{array}, \quad \begin{array}{r} ? \\ 27 \overline{) 97.2} \end{array}, \quad \begin{array}{r} ? \\ 27 \overline{) 9.72} \end{array}$$

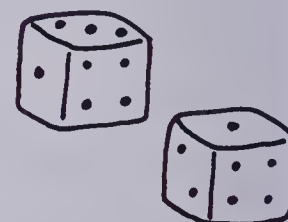
$$19. \quad \begin{array}{r} 236 \\ 22 \overline{) 5192} \end{array}, \quad \begin{array}{r} ? \\ 22 \overline{) 519.2} \end{array}, \quad \begin{array}{r} ? \\ 22 \overline{) 51.92} \end{array}, \quad \begin{array}{r} ? \\ 22 \overline{) 5.192} \end{array}$$

$$\star 20. \quad \begin{array}{r} 107 \\ 35 \overline{) 3745} \end{array}, \quad \begin{array}{r} ? \\ 35 \overline{) 374.5} \end{array}, \quad \begin{array}{r} ? \\ 35 \overline{) 37.45} \end{array}, \quad \begin{array}{r} ? \\ 35 \overline{) 3.745} \end{array}$$

Go Ahead, Back Up!

Play this
game with
some
classmates.

30	31	36	37	42	43	44	45
29	32	35	38	41	48	47	46
28	33	34	39	40	49	50	51
27	26	25			54	53	52
22	23	24			55	56	57
21	20	19	10	9	4	3	58
16	17	18	11	8	5	2	59
15	14	13	12	7	6	1	60
						Start	Finish



- Materials:**
- 2 dice each with the numbers 1, 2, 3, 4, 5, and 6.
 - 2 to 4 players
 - a coloured marker for each player
 - game board

Play: Each player in turn rolls both dice, multiplies the two numbers face up on the dice, then subtracts the larger factor from the product. The difference represents the number of spaces the player may move on the game board. (If doubles are rolled, the player must move back the number of spaces equal to the value of one die. No player is required to move back farther than the starting gate.) First player to cross the finish line wins!

Sample Play: Sandy rolls $\boxed{3}$, $\boxed{4}$. $3 \times 4 = 12$ $12 - 4 = 8$ Go ahead 8 spaces.
Mandy rolls $\boxed{6}$, $\boxed{1}$. $6 \times 1 = 6$ $6 - 6 = 0$ No move!
Randy rolls $\boxed{5}$, $\boxed{5}$ — Doubles! Back up 5 spaces.

Variation: Winner is that player to reach 60 with an exact roll!

Arrow Maps

What is the destination number of this arrow map?

$$\boxed{24} \xrightarrow{+} \xrightarrow{+} \xrightarrow{\downarrow} \xrightarrow{-} = (?)$$



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Step 1. Find the starting number on the grid above. $\xrightarrow{\quad}$ $\boxed{24}$

Step 2. Follow the direction for each arrow with your finger, writing the numbers and operations in your workbook. $\xrightarrow{+} 24 + 25 + 35 - 26$

Step 3. Calculate to find the destination number of the map! $\xrightarrow{+} 24 + 25 + 35 - 26 = \boxed{58}$

Destination number is $\boxed{58}$.

Exercises

What are the destination numbers of these maps?

1. $\boxed{33} \xrightarrow{+} \xrightarrow{+} \xrightarrow{-} \xrightarrow{+} = (?)$
 $33 + 23 + 13 - 14 + ? = (?)$

2. $\boxed{6} \xrightarrow{\times} \xrightarrow{+} \xrightarrow{-} \xrightarrow{+} = (?)$
 $6 \times 7 + 8 - ? + ? = (?)$

3. $\boxed{89} \xrightarrow{-} \xrightarrow{+} \xrightarrow{\downarrow} \xrightarrow{-} = (?)$

4. $\boxed{5} \xrightarrow{\times} \xrightarrow{\div} \xrightarrow{+} \xrightarrow{+} = (?)$

5. $\boxed{51} \xrightarrow{+} \xrightarrow{+} \xrightarrow{-} \xrightarrow{+} \xrightarrow{-} = (?)$

6. $\boxed{2} \xrightarrow{\times} \xrightarrow{-} \xrightarrow{+} \xrightarrow{+} \xrightarrow{-} = (?)$

7. $\boxed{40} \xrightarrow{+} \xrightarrow{-} \xrightarrow{+} \xrightarrow{+} \xrightarrow{+} \xrightarrow{-} = (?)$

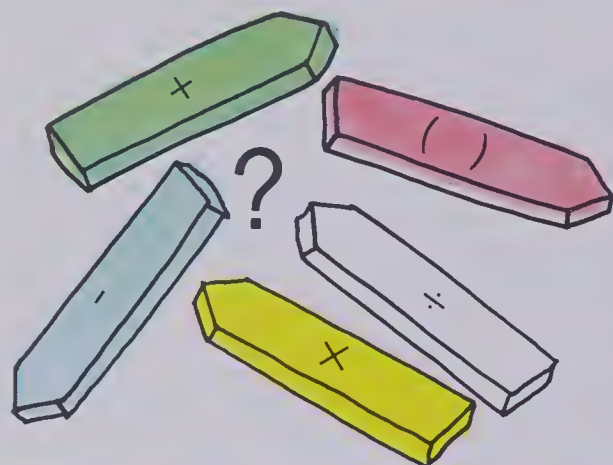
8. $\boxed{5} \xrightarrow{\times} \xrightarrow{-} \xrightarrow{-} \xrightarrow{+} \xrightarrow{-} \xrightarrow{+} = (?)$

9. $\boxed{64} \xrightarrow{+} \xrightarrow{-} \xrightarrow{+} \xrightarrow{-} \xrightarrow{+} \xrightarrow{-} = (?)$

10. $\boxed{85} \xrightarrow{+} \xrightarrow{+} \xrightarrow{-} \xrightarrow{-} \xrightarrow{+} \xrightarrow{+} = (?)$

Make some arrow maps for a classmate!

Signals and Signposts



$$\begin{aligned} &2 + (3 \times 6) \\ &= 2 + 18 \\ &= 20 \end{aligned}$$



$$\begin{aligned} &(2 + 3) \times 6 \\ &= 5 \times 6 \\ &= 30 \end{aligned}$$

What signal says
"Do me first!"?

Rule: Perform operations within brackets first.

Exercises

Perform the operations.

1. (a) $3 + (5 \times 2)$
(b) $(3 + 5) \times 2$

2. (a) $(4 + 8) \div 2$
(b) $4 + (8 \div 2)$

3. (a) $(12 - 5) \times 2$
(b) $12 - (5 \times 2)$

4. (a) $4 \times (5 + 9)$
(b) $(4 \times 5) + 9$

5. (a) $7 \times (8 \div 2)$
(b) $(7 \times 8) \div 2$

6. (a) $(24 \div 6) - 3$
(b) $24 \div (6 - 3)$

7. (a) $21 - (6 + 7)$
(b) $(21 - 6) + 7$

8. (a) $(18 - 4) \div 2$
(b) $18 - (4 \div 2)$

9. (a) $(6 \times 8) - 5$
(b) $6 \times (8 - 5)$

10. (a) $36 \div (3 + 3)$
(b) $(36 \div 3) + 3$

11. (a) $(16 \div 4) \times 2$
(b) $16 \div (4 \times 2)$

12. (a) $7 \times (9 \div 3)$
(b) $(7 \times 9) \div 3$

★ Copy and insert brackets to make each number sentence true.

13. $3 + 9 \div 3 = 4$

14. $4 \times 8 - 7 = 25$

15. $4 + 6 \div 2 = 7$

16. $15 - 8 + 2 = 5$

17. $8 + 4 \div 4 = 3$

18. $3 - 2 - 1 = 2$

19. $5 \times 9 + 6 = 51$

20. $40 \div 8 - 4 = 1$

21. $31 - 9 + 2 = 20$

A Skill-Testing Question

Win a new colour TV set!
Send in 4 Crunchos'
box tops and answer
this skill-testing
question!

$$8 + 2 \times 5$$

Annette wrote:

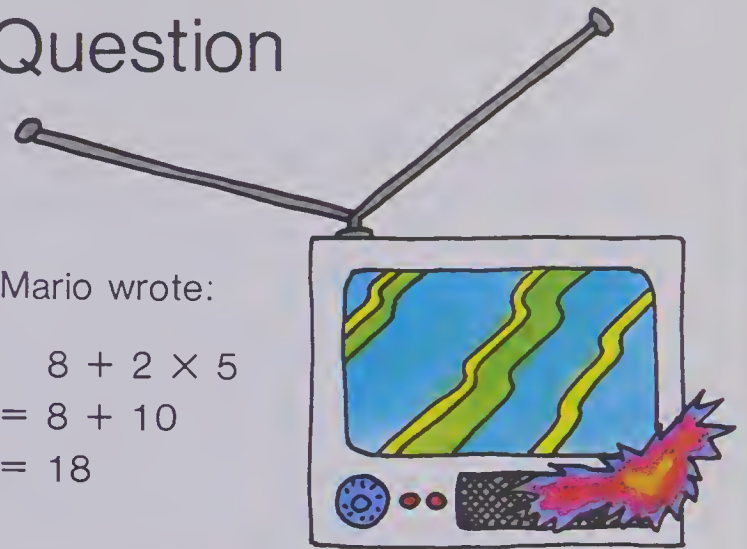
$$\begin{aligned} &8 + 2 \times 5 \\ &= 10 \times 5 \\ &= 50 \end{aligned}$$

?

Mario wrote:

$$\begin{aligned} &8 + 2 \times 5 \\ &= 8 + 10 \\ &= 18 \end{aligned}$$

Who is right?



Use the order of operations rule to decide.

If there are no brackets:

First: Perform all multiplication and division operations in left-to-right order;

Second: Perform all addition and subtraction operations in left-to-right order.

Exercises

Perform the operations. Use the order of operations rule.

1. $5 + 6 \times 2$

2. $12 - 2 \times 3$

3. $9 \div 3 - 2$

4. $3 \times 4 \div 2$

5. $18 - 5 + 2$

6. $12 - 4 \div 4$

7. $3 + 5 \times 4$

8. $11 + 6 - 3$

9. $8 \div 2 \times 4$

10. $12 - 6 \div 3$

11. $9 + 10 \div 5$

12. $6 \times 7 + 8$

Be careful with these!

13. $\begin{aligned} &2 + 3 \times 4 - 5 \\ &= 2 + 12 - 5 \\ &= 14 - 5 \\ &= 9 \end{aligned}$

14. $7 + 8 - 4 \times 3$

15. $6 \times 4 \div 8 + 5$

16. $12 \div 4 \times 3 - 2$

17. $45 - 15 \div 3 \times 7$

18. $18 + 4 - 9 + 5$

19. $7 + 8 \times 6 \div 12$

20. $4 \times 7 - 21 \div 3$

21. $19 - 5 + 3 \times 10$

Some Do, Some Don't

This expression has brackets.

$$\begin{aligned}(6 + 8) \div 2 \\&= 14 \div 2 \\&= 7\end{aligned}$$

This one doesn't.

$$\begin{aligned}5 + 3 \times 2 \\&= 5 + 6 \\&= 11\end{aligned}$$

This is how Andrea remembers order of operations.

Brackets first (if any)

Multiplication and

Division in left-to-right order

Addition and

Subtraction in left-to-right order

Bless

{ My

{ Dear

{ Aunt

{ Sally

This will help
you remember.

Exercises

Perform the operations.

1. $(7 + 8) \div 3$

4. $12 + 24 \div 4$

7. $11 + 5 - 3$

10. $15 \div 3 - 4$

13. $7 \times 8 + 3$

2. $14 - 2 \times 5$

5. $6 \times 7 - 10$

8. $5 \times 8 \div 4$

11. $20 \div (5 \times 2)$

14. $(9 + 1) \times 6$

3. $5 \times (4 + 2)$

6. $(14 - 7) \times 9$

9. $24 \div (7 + 5)$

12. $(14 - 3) \times 5$

15. $2 \times 3 \times 4$

Be careful with these!

16. $(6 + 8) \div 2 + 5$
 $= 14 \div 2 + 5$
 $= 7 + 5$
 $= 12$

19. $9 \times 7 + 3 \times 7$

22. $12 + 8 + 5 \times 3$

25. $(14 + 10) \div 2 - 5$

17. $7 + 8 - 4 \times 3$

20. $(16 - 9) \times (12 \div 4)$

23. $(6 \times 8) \div (6 - 2)$

★ 26. $8 \times (9 - 3) \div 3$

18. $25 \div (4 + 1) - 5$

21. $28 \div (5 + 2) \times 8$

24. $23 - 2 \times 8 - 2$

★ 27. $4 \times 5 \div 4 \times 5$

Number-Cube Challenge

Try this!

Place the 3 number cubes to make true number sentences.

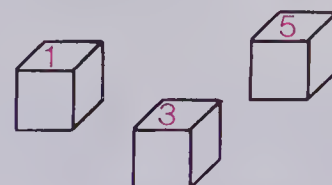
1. $\begin{array}{|c|} \hline 5 \\ \hline \end{array} - \begin{array}{|c|} \hline 3 \\ \hline \end{array} - \begin{array}{|c|} \hline 1 \\ \hline \end{array} = 1$

3. $\begin{array}{|c|} \hline \\ \hline \end{array} - (\begin{array}{|c|} \hline \\ \hline \end{array} - \begin{array}{|c|} \hline \\ \hline \end{array}) = 3$

5. $(\begin{array}{|c|} \hline \\ \hline \end{array} + \begin{array}{|c|} \hline \\ \hline \end{array}) \times \begin{array}{|c|} \hline \\ \hline \end{array} = 8$

7. $\begin{array}{|c|} \hline \\ \hline \end{array} \times (\begin{array}{|c|} \hline \\ \hline \end{array} - \begin{array}{|c|} \hline \\ \hline \end{array}) = 10$

9. $\begin{array}{|c|} \hline \\ \hline \end{array} \times \begin{array}{|c|} \hline \\ \hline \end{array} - \begin{array}{|c|} \hline \\ \hline \end{array} = 14$



Use these number cubes only.

2. $(\begin{array}{|c|} \hline \\ \hline \end{array} + \begin{array}{|c|} \hline \\ \hline \end{array}) \div \begin{array}{|c|} \hline \\ \hline \end{array} = 2$

4. $\begin{array}{|c|} \hline \\ \hline \end{array} + \begin{array}{|c|} \hline \\ \hline \end{array} - \begin{array}{|c|} \hline \\ \hline \end{array} = 7$

6. $\begin{array}{|c|} \hline \\ \hline \end{array} + \begin{array}{|c|} \hline \\ \hline \end{array} + \begin{array}{|c|} \hline \\ \hline \end{array} = 9$

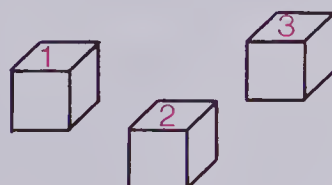
8. $(\begin{array}{|c|} \hline \\ \hline \end{array} - \begin{array}{|c|} \hline \\ \hline \end{array}) \times \begin{array}{|c|} \hline \\ \hline \end{array} = 12$

10. $\begin{array}{|c|} \hline \\ \hline \end{array} \times \begin{array}{|c|} \hline \\ \hline \end{array} + \begin{array}{|c|} \hline \\ \hline \end{array} = 16$

Now try this!

Make true number sentences.

- (i) Use each of the number cubes.
- (ii) Use any combination of $+$, $-$, \times , and \div .
- (iii) Use brackets where necessary.



11. $\begin{array}{|c|} \hline 3 \\ \hline \end{array} - \begin{array}{|c|} \hline 2 \\ \hline \end{array} - \begin{array}{|c|} \hline 1 \\ \hline \end{array} = 0$

13. $\begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} = 2$

15. $\begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} = 4$

17. $\begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} = 6$

19. $\begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} = 8$

12. $\begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} = 1$

14. $\begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} = 3$

16. $\begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} = 5$

18. $\begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} = 7$

20. $\begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} \bullet \begin{array}{|c|} \hline \\ \hline \end{array} = 9$

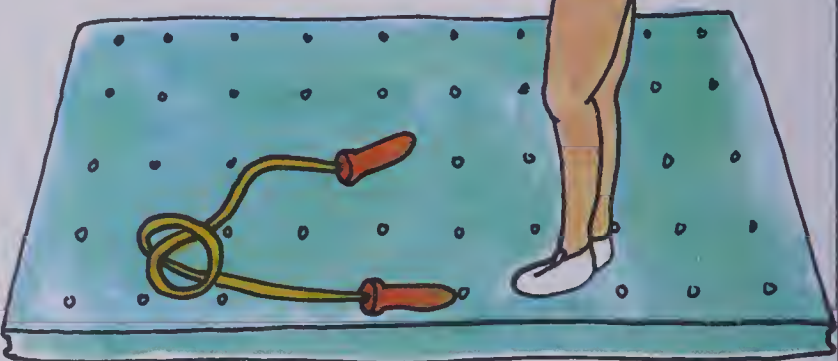
Robert Nelson is training for the Canadian Weightlifting Championship!



Weightlifting

Here is his score card for the weightlifting competition!

First lift	—	75 kg
Second lift	—	80 kg
Third lift	—	73 kg



What is Robert Nelson's **average** lift?

$(75 + 80 + 73) \div 3 = 76$

Total Sum of Lifts		Number of Lifts		Average Lift
228	\div	3	$=$	76

Exercises

1. Here is Paul LaFleur's score card.

First lift	—	66 kg
Second lift	—	63 kg
Third lift	—	71 kg
Fourth lift	—	68 kg

- (a) What is the sum of all the lifts?
- (b) How many lifts are there altogether?
- (c) What is Paul LaFleur's average lift?

2. Here is a record of some practice lifts made before the championships. Find the average lift of each weight lifter.

	Name	Practice Lifts (in kilograms)						Average Lift
		1st	2nd	3rd	4th	5th	6th	
(a)	Doug Schott	56	51	58	51	—	—	■
(b)	Guy LeBlanc	65	64	69	62	70	—	■
(c)	Dale Brown	41	40	45	—	—	—	■
(d)	Fred Simms	83	82	77	80	85	85	■
(e)	George White	73	81	74	68	—	—	■

The World of Sports

Punt Return: Al Schroeder made the following returns.
What was his average return?
28, 39, 40, 33.

Golf Classics: Peggy Bradshaw made these scores for 3 rounds.
What was her average score?
67, 74, 72.

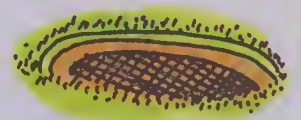
Goals Against: The goalie for the Northern Flyers has this
score for a 5-game series.
What is his average?
2, 1, 3, 2, 2.

Gymnastics: During the Senior Women's Event, Nancy Young
obtained the following scores.
What was her average score?
9.5, 7.6, 9.2, 5.8, 8.4.

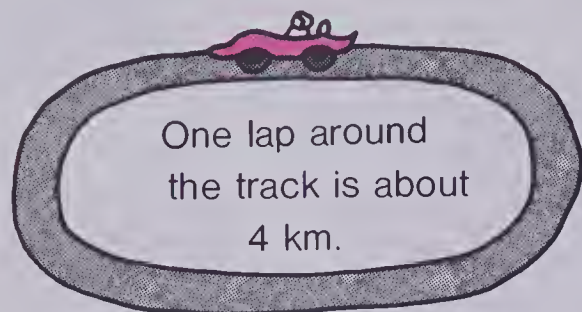
Hockey: Robert Perreau received these points for goals
and assists over a 7-game series.
What is his average?
2, 1, 4, 1, 2, 1, 3.

Swimming: The Dairy City Relay Team received these times
for each 100 of a 400 m relay.
What was the average time?
60, 61, 58, 61.

Auto Rally: The driver for the Valleyview Racing Team
received scores for each checkpoint.
What was his average score?
18, 15, 12, 14, 19, 18.



“Indy 800”



Drivers try to complete 200 laps (or 800 km) in the shortest time!

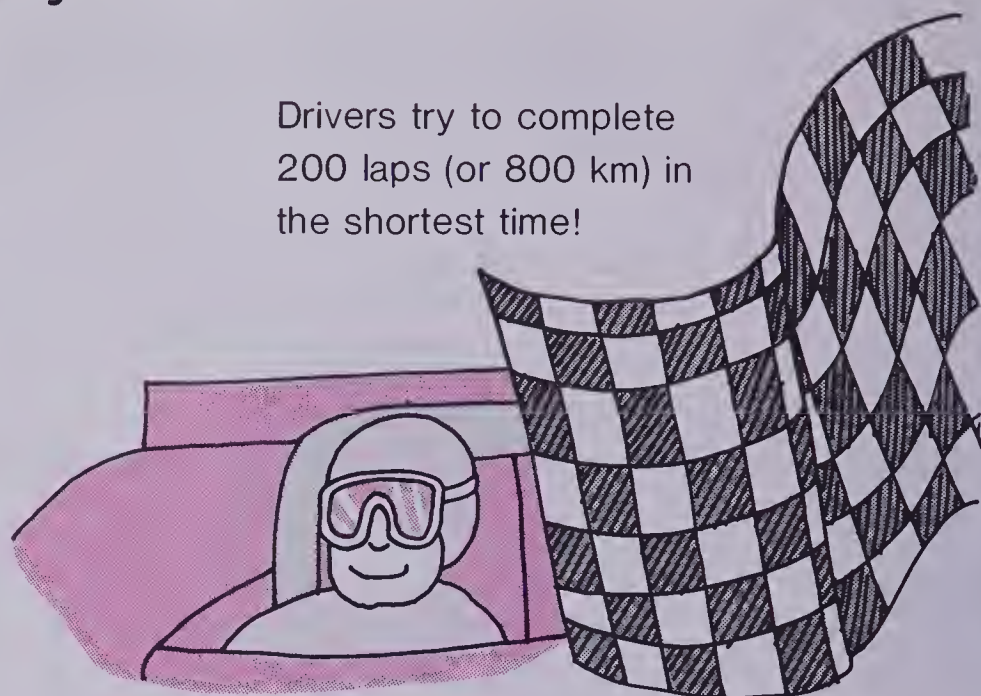
Al Ferrati made 3 practice laps.

1st lap — 241 km/h

2nd lap — 223 km/h

3rd lap — 250 km/h

What was Al Ferrati's *average speed*?



Exercises

Other drivers made practice laps. Find the *average speed* for each driver for the number of laps driven.

	Driver	Practice Laps (in km/h)						Average Speed
		# 1	# 2	# 3	# 4	# 5	# 6	
(a)	Rod Emerson	198	171	185	190	—	—	■
(b)	Wendy Graham	216	206	225	224	224	—	■
(c)	Mike Taylor	240	225	243	—	—	—	■
(d)	Conrad Dent	223	211	—	—	—	—	■
(e)	Phil Laver	247	229	240	235	240	243	■
(f)	Tom Barlow	228	236	222	232	232	—	■



BRAINTICKLER

Using any of the 4 operations (and brackets if necessary), make the numbers from 1 to 10 with 3's only.

The first one is done for you!

$$(\boxed{3} + \boxed{3}) \div (\boxed{3} + \boxed{3}) = 1$$

$$\boxed{3} \cdot \boxed{3} \cdot \boxed{3} \cdot \boxed{3} = 2$$

$$\boxed{3} \cdot \boxed{3} \cdot \boxed{3} \cdot \boxed{3} = 3$$

$$\boxed{3} \cdot \boxed{3} \cdot \boxed{3} \cdot \boxed{3} = 4$$

$$\boxed{3} \cdot \boxed{3} \cdot \boxed{3} \cdot \boxed{3} = 5$$

$$\boxed{3} \cdot \boxed{3} \cdot \boxed{3} \cdot \boxed{3} = 6$$

$$\boxed{3} \cdot \boxed{3} \cdot \boxed{3} \cdot \boxed{3} = 7$$

$$\boxed{3} \cdot \boxed{3} \cdot \boxed{3} \cdot \boxed{3} = 8$$

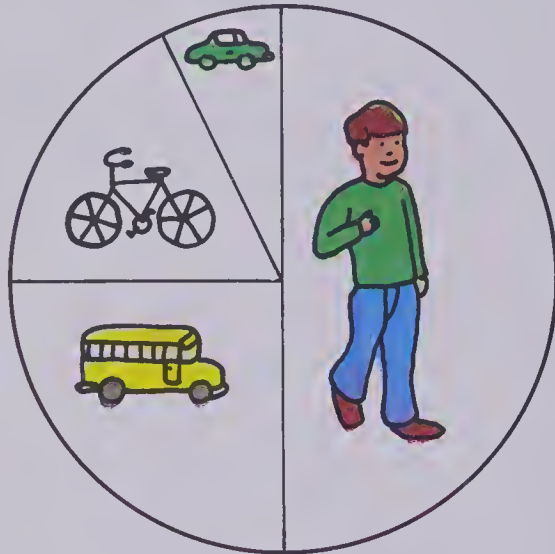
$$\boxed{3} \cdot \boxed{3} \cdot \boxed{3} \cdot \boxed{3} = 9$$

$$\boxed{3} \cdot \boxed{3} \cdot \boxed{3} \cdot \boxed{3} = 10$$

Try using 5's.

Circle Graphs

HOW STUDENTS COME TO SCHOOL



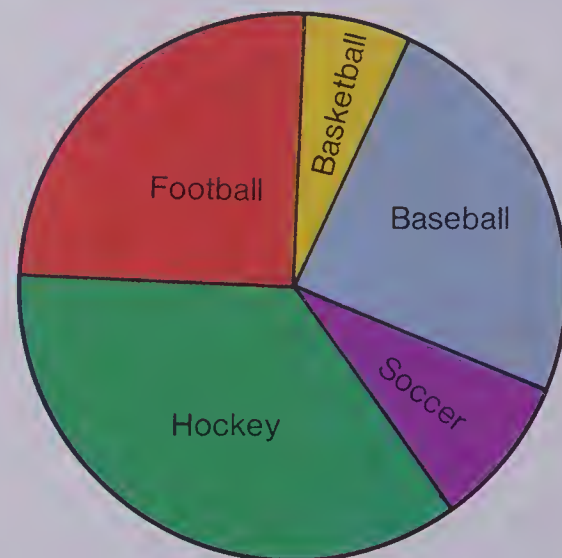
Some **circle graphs** use pictures.

1. What does each picture represent?
2. How do most students come to school?
3. How do the fewest students come to school?
4. Do more students ride their bicycles or take the bus to school?
5. About what fraction of the students walk to school?

Some circle graphs use words.

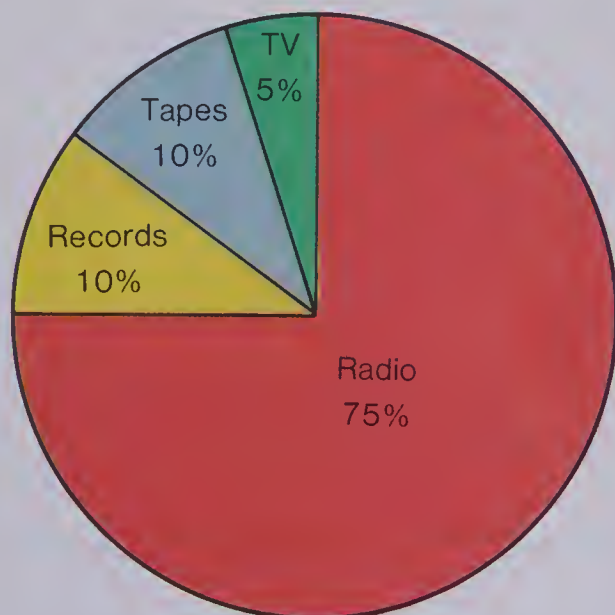
The Grade 5 students at Meadowvale School were asked which sports they enjoyed watching the most.

FAVOURITE TV SPORTS



6. Which sport did most students enjoy watching?
7. Which sport did the fewest students enjoy watching?
8. Which is more popular, football or soccer?
9. Which two sports are enjoyed equally well?

HOW STUDENTS LISTEN TO MUSIC



Some circle graphs use percent.

All of the Grade 5 students at Fairview School were asked how they listened to music.

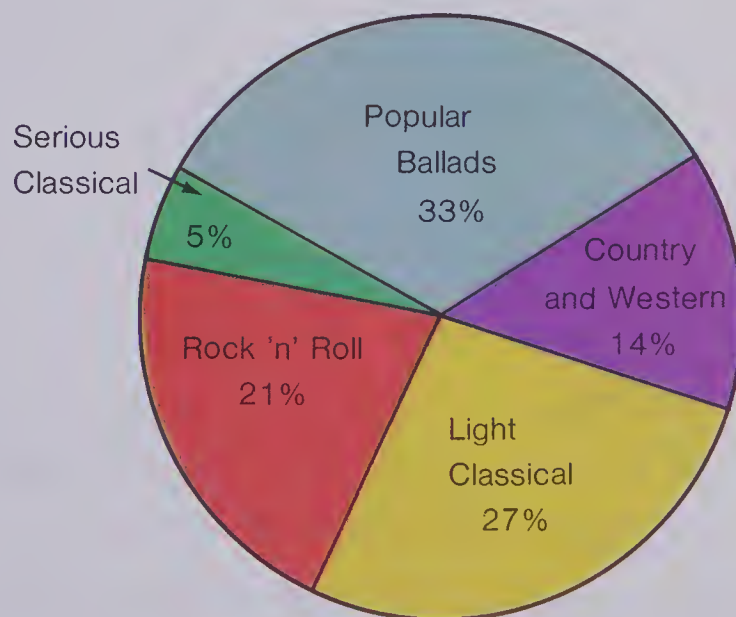
10. What percent of all the students like to listen to music on
 - (a) radio?
 - (b) tapes?
 - (c) records?
 - (d) TV?
11. (a) Find the sum of the percents.
(b) What does this sum represent?

12. What is the most popular method for listening to music?
13. What two methods are equally popular?
14. How do you listen to music? How do your friends listen to music?

People in a neighbourhood were asked about their favourite kinds of music.

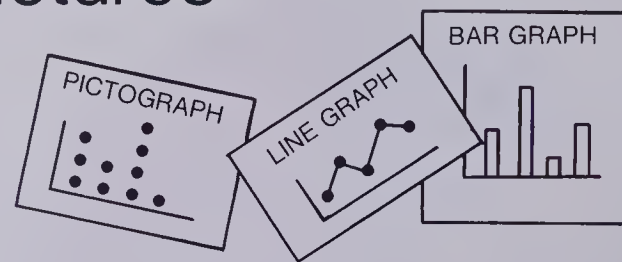
15. (a) Find the sum of the percents.
(b) What does this sum represent?
16. Which is more popular:
 - (a) Rock 'n' Roll or Country and Western?
 - (b) Rock 'n' Roll or Light Classical?
17. What percent of the people listen to
 - (a) Popular Ballads *and* Light Classical?
 - (b) Serious Classical *and* Country and Western?

FAVOURITE KINDS OF MUSIC



Information Pictures

Graphs are pictures that display information.



Reta and Brant used these 3 steps to construct a graph.

Step 1. Choose a question.



Reta and Brant asked, “What are the favourite colours in our class?”

Step 2. Collect and organize the information to answer the question.



They recorded the choice of each student.

Colour	Tally	Number
Blue	//// ///	8
Green	////	5
Red	//// //// //	12
Brown	//	2
Yellow	////	5

Step 3. Construct a graph that pictures your information clearly.



They constructed a **pictograph**.

FAVOURITE COLOURS OF OUR CLASS

Blue	😊 😊 😊 😊
Green	😊 😊 😊
Red	😊 😊 😊 😊 😊 😊
Brown	😊
Yellow	😊 😊 😊

Each 😊 represents 2 students.

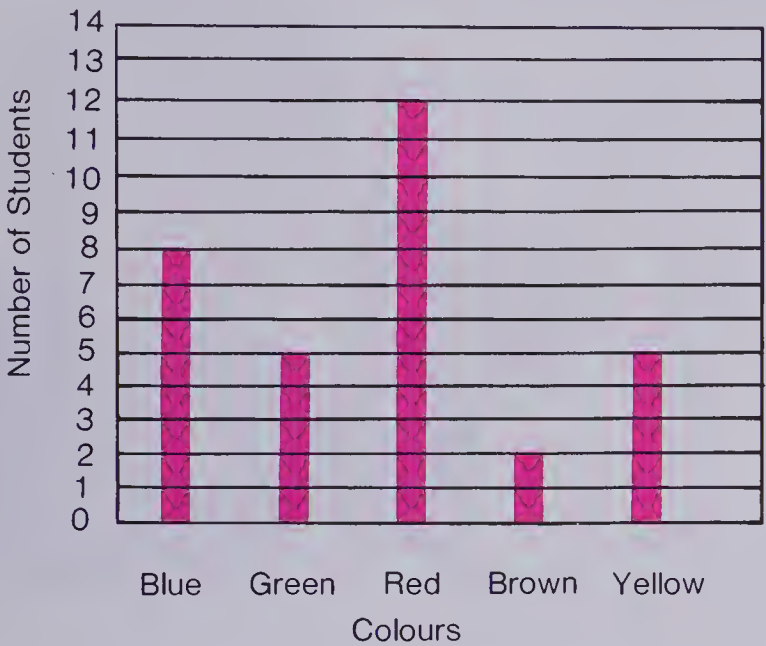
Reta and Brant presented their *pictograph* to the class.

Help them to answer these questions.

1. How many chose red? yellow? blue? green? brown?
2. How many more students chose red than yellow? blue than brown? red than blue?

Randy and Maria used the same information to construct a **bar graph**.

FAVOURITE COLOURS OF OUR CLASS



3. Which of the two graphs do you think pictures the information best?
4. Which of the two graphs makes it easier to answer Exercises 1 and 2?



5. Let's conduct an experiment!

Step 1. Ask this question: "Of the soft drinks on this list, which is your favourite?"

Step 2. Collect and organize the information.
Record the choice of each person on a table like this.
How might you find out each person's choice?

Soft Drink	Tally	Number
Ginger Ale		
Cola		
Orange		
Root Beer		

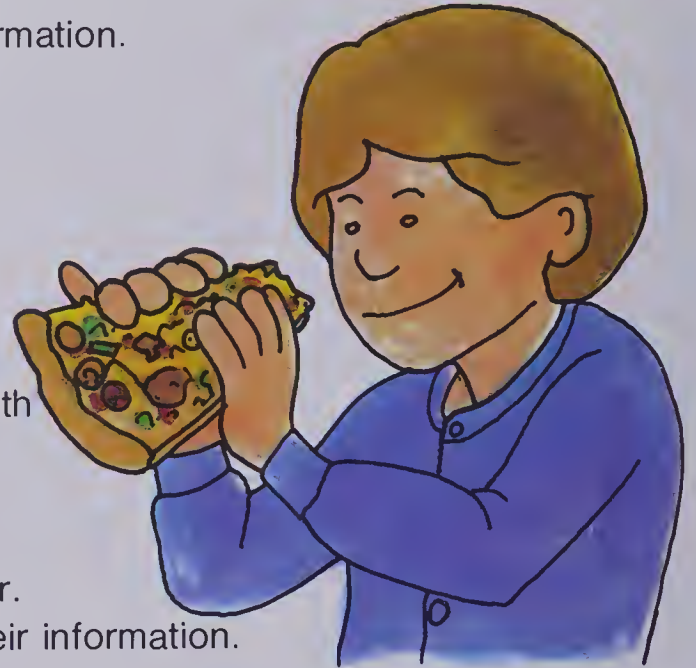
Step 3. Construct a graph, using the information you have collected.
Which kind of graph would you choose?



More Graphs

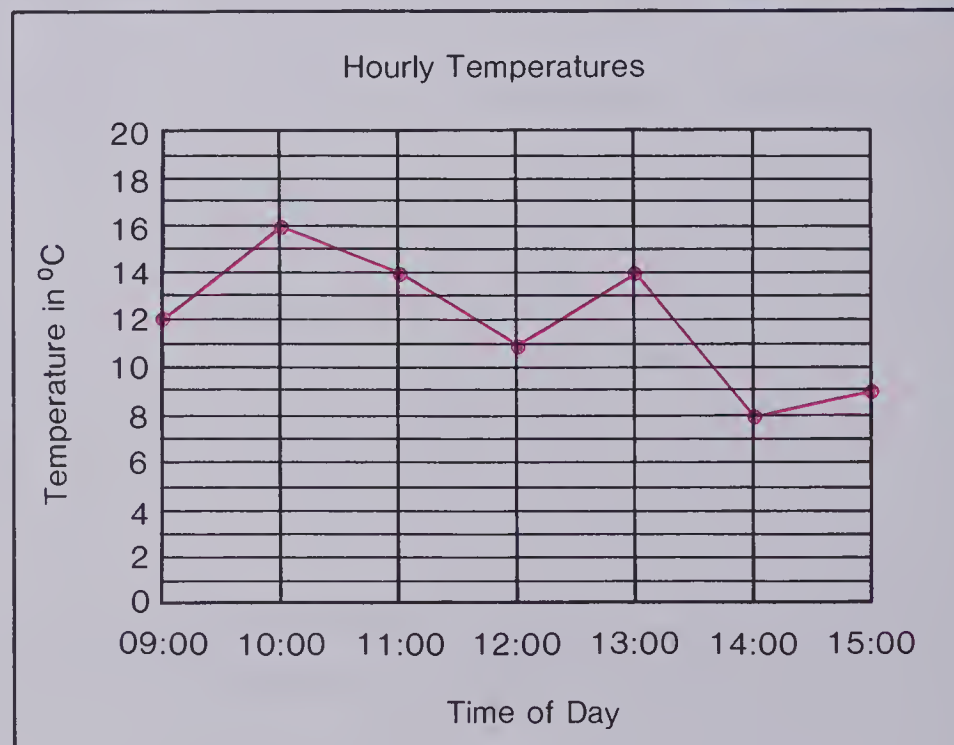
1. Conduct an experiment about one of these topics. Remember to use the 3 steps on Page 290. Make a graph that best pictures your information.

- (a) Favourite ice-cream flavour
- (b) Favourite foods
- (c) Pets in the home
- (d) Favourite TV shows
- (e) Favourite cartoons
- (f) Number of students with birthdays each month
- (g) Number of days of rain, cloud, and sun in a month
- (h) Team standings for hockey, baseball, or soccer

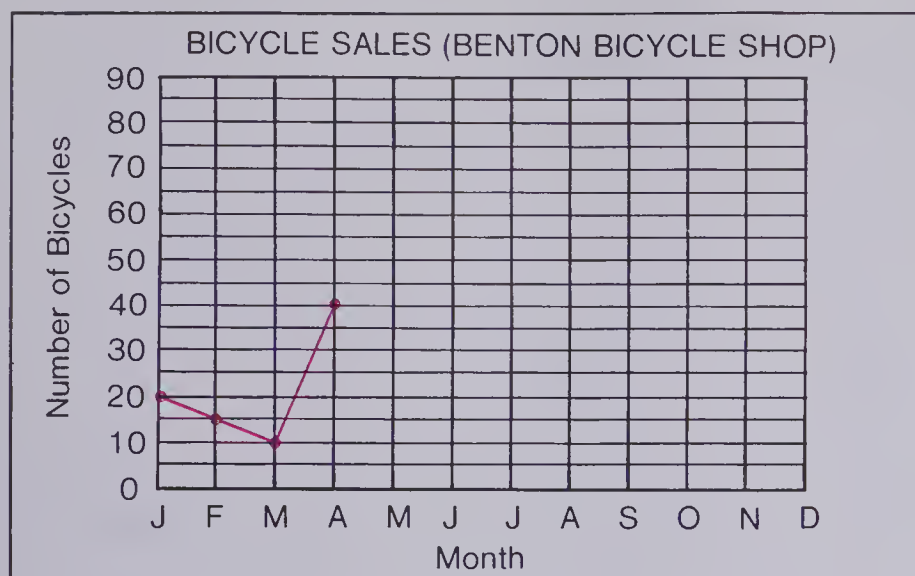


2. Fred and Freda measured the temperature each hour. They constructed a **broken line graph** to picture their information.

Time of Day	°C
09:00	12
10:00	16
11:00	14
12:00	11
13:00	14
14:00	8
15:00	9



Compare this graph to a (a) pictograph (b) bar graph.
In what ways is it different? similar?



Month	Bicycles Sold
Jan.	20
Feb.	15
Mar.	10
Apr.	40
May	50
June	50
July	55
Aug.	40
Sept.	25
Oct.	15
Nov.	10
Dec.	75

3. Copy and complete this graph using the information in the table.
(The first 4 months have been done for you!)
4. Conduct one of these experiments. Construct a broken line graph to picture your information.
 - (a) Record the hourly temperature outside your school.
 - (b) Record the highest daily temperature for one week.
 - (c) Record the highest daily temperature for one month.
 - (d) Record the attendance of students in your classroom.
 - (e) Record the average weekly rainfall (or snowfall).
 - (f) Record your test marks over a period of time.

Tune Up

Estimate by rounding up and rounding down. Calculate.

1.
$$\begin{array}{r} 52 \\ \times 46 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 76 \\ \times 84 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 32 \\ \times 48 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 56 \\ \times 62 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 74 \\ \times 18 \\ \hline \end{array}$$

Divide using short division.

6. $4 \overline{)685}$

7. $7 \overline{)973}$

8. $6 \overline{)714}$

9. $9 \overline{)1032}$

10. $8 \overline{)6408}$

11. $7 \times 3 + 5 - 6$

12. $8 \div 2 + 4 \times 2$

13. $28 - 6 \times 4 + 5$

Chapter Test

1. (a) Show how you would *estimate* the answers for these questions.

$$\begin{array}{r} (i) \quad 275 \\ + 423 \\ \hline \end{array}$$

$$\begin{array}{r} (ii) \quad 720 \\ - 387 \\ \hline \end{array}$$

$$\begin{array}{r} (iii) \quad 86 \\ \times 52 \\ \hline \end{array}$$

- (b) Find the answer for each question.

2. Use *short division* to find the quotients.

$$(a) \quad 6 \overline{)84}$$

$$(b) \quad 7 \overline{)238}$$

$$(c) \quad 4 \overline{)508}$$

$$(d) \quad 5 \overline{)1205}$$

3. Divide.

$$(a) \quad 3 \overline{)2.7}$$

$$(b) \quad 4 \overline{)11.2}$$

$$(c) \quad 6 \overline{)10.8}$$

$$(d) \quad 7 \overline{)17.36}$$

$$(e) \quad 23 \overline{)16.1}$$

$$(f) \quad 21 \overline{)73.5}$$

$$(g) \quad 36 \overline{)169.2}$$

$$(h) \quad 26 \overline{)54.34}$$

4. Solve.

- (a) 174 empty pop bottles.
6 bottles in every case.
How many cases?

- (b) 25.2 m of sailing rope.
It is cut into 4 equal pieces.
What is the length of each piece?

5. Perform the operations.

$$(a) \quad (6 + 8) \div 2$$

$$(b) \quad 18 - 2 \times 5$$

$$(c) \quad 24 \div (3 \times 4)$$

$$(d) \quad 5 \times 8 + 2$$

$$(e) \quad 6 \times 5 + 5 \times 3$$

$$(f) \quad 32 \div (3 + 1) - 4$$

6. Find the average of each set of numbers.

$$(a) \quad 21, 25, 19, 23$$

$$(b) \quad 14.2, 13.1, 16.5$$

$$(c) \quad 83, 90, 79, 85, 83$$

7. Construct a line graph to show the information in this table.

Highest Weekly Temperatures for July

Week	Temperature
first	26
second	21
third	27
fourth	32
fifth	28

Cumulative Review

1. Calculate.

$$\begin{array}{r} (a) \quad 4629 \\ -1708 \\ \hline \end{array}$$

$$\begin{array}{r} (b) \quad 50.16 \\ -37.24 \\ \hline \end{array}$$

$$\begin{array}{r} (c) \quad 238 \\ \times 41 \\ \hline \end{array}$$

$$(d) \quad 5 \overline{)1035}$$

2. Write the following as products of their prime factors.

(a) 24

(b) 45

(c) 39

3. Write the greatest common factor of each pair of numbers.

(a) 3, 21

(b) 5, 10

(c) 27, 18

4. Write the least common multiple of each pair of numbers.

(a) 4, 8

(b) 3, 7

(c) 4, 6

5. Express each as a decimal.

(a) $\frac{1}{4}$

(b) $\frac{7}{10}$

(c) 65%

(d) $\frac{2}{5}$

6. Express each as a fraction.

(a) 37%

(b) 0.43

(c) 1.7

(d) 0.2

7. Express each as a percent.

(a) $\frac{3}{10}$

(b) 0.45

(c) $\frac{1}{4}$

(d) $\frac{9}{20}$

8. Calculate.

(a) 10% of 42

(b) 90% of 35

9. Add.

$$(a) \quad \frac{8}{10} + \frac{5}{10}$$

$$(b) \quad \frac{3}{4} + \frac{1}{8}$$

$$(c) \quad 2\frac{2}{5} + 6\frac{1}{5}$$

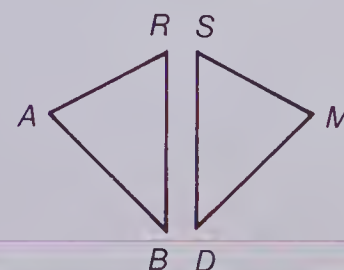
10. Subtract.

$$(a) \quad \frac{6}{8} - \frac{1}{8}$$

$$(b) \quad \frac{7}{8} - \frac{5}{12}$$

$$(c) \quad 7\frac{3}{4} - 2\frac{1}{4}$$

11. These two triangles are congruent. Name the matching vertices.



Chapter 10

Geometry

Symmetry

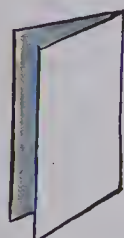
Congruence

Slides, Turns, and Flips



Line Symmetry

Fold a piece of paper.



Cut a pattern.



Open.

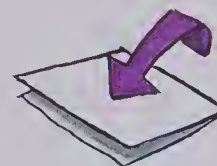


Line of symmetry

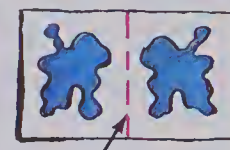
Put paint on paper.



Fold and press.



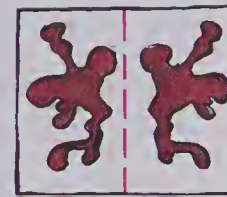
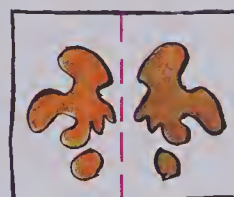
Open.



Line of symmetry

Exercises

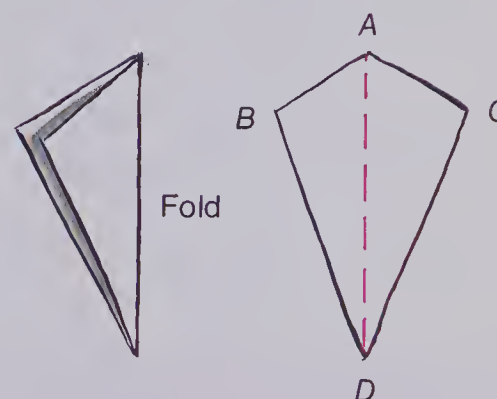
1. Make designs using the two methods shown above.



2. Fold paper and cut a pattern that looks like this. Open.

This is called a **kite**.

- (a) How many sides does a kite have?
- (b) Measure sides AB and AC on your kite.
What do you notice?
- (c) Measure sides BD and CD . What do you notice?
- (d) How many pairs of equal sides does a kite have?
- (e) How many lines of symmetry does a kite have?



3. Put a paint spot on paper.

Fold and press. Open.

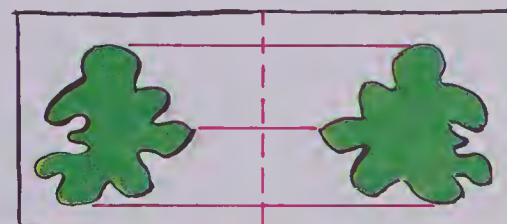
Mark the line of symmetry.

Pick a point on one half.

Draw a line to its match in the other half.

Do this for two other points.

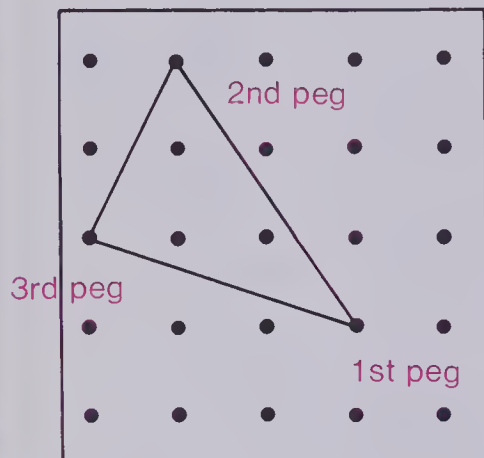
What do you notice about these lines?



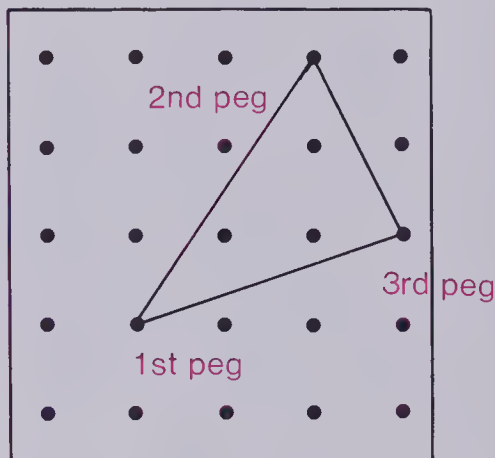
Flip Images

Work in pairs. Use geo-boards.

1st player



2nd player



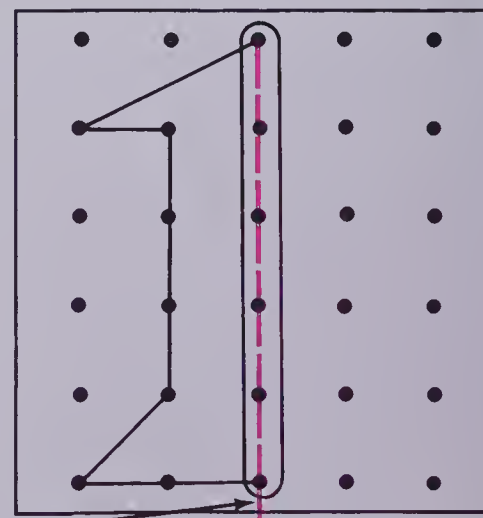
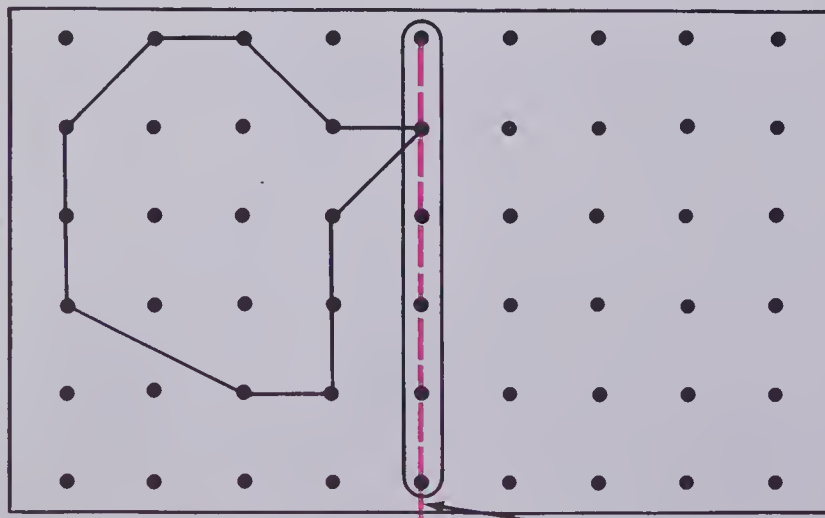
To play:

The first player makes a shape on the geo-board.

The second player must make the flip image of the shape.

Exercises

1. Play the game above in pairs. Take turns making the first pattern. A point is won for each correct image.
2. Make each pattern on your geo-board. Then make the flip pattern.



Line of symmetry

More Flip Images

1. Use dot paper.

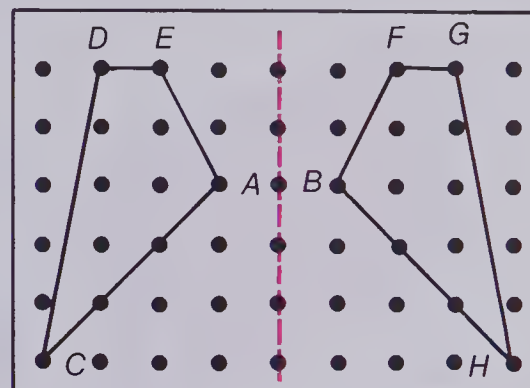
Make a pattern on the left side.

Draw a line of symmetry.

Draw the flip image on the right side.

Point *B* matches point *A*.

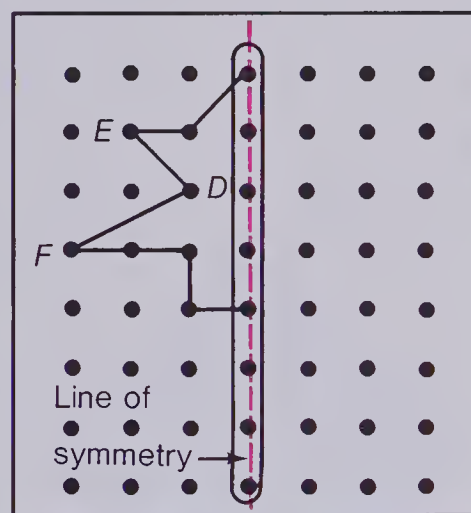
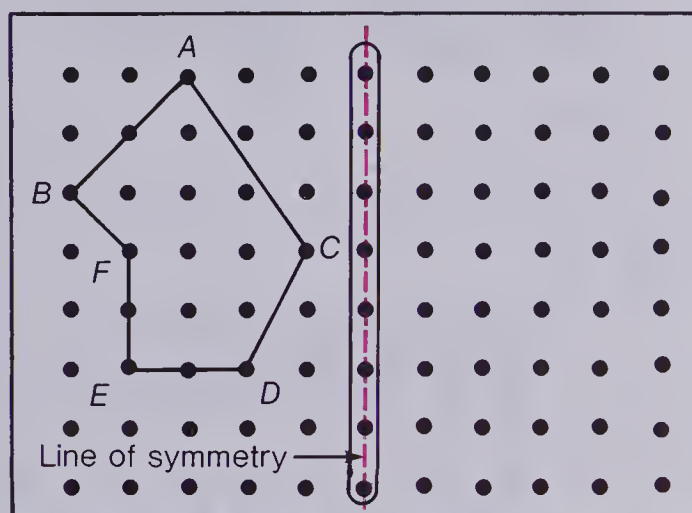
What point matches point *D*? *C*? *E*?



2. (a) Use dot paper.

Copy each pattern.

Make the flip image of each.



- (b) How far is each point and its matching point from the line of symmetry?

A

B

C

D

E

F

BRAINTICKLER

Solitaire.

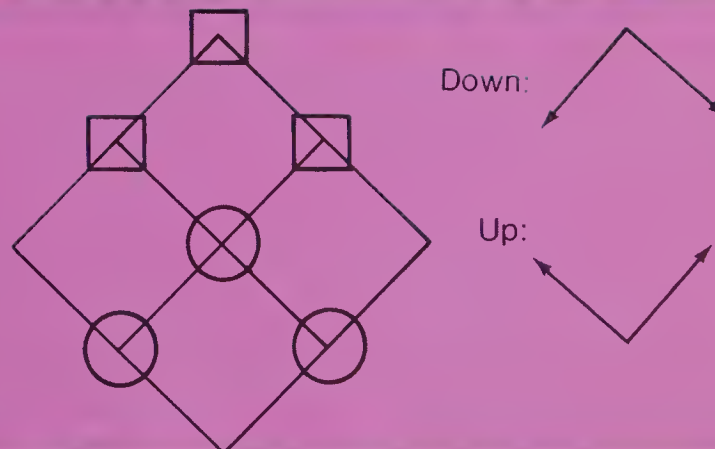
Trace the grid pattern.

Place square and circular markers as shown.

Squares move down only.

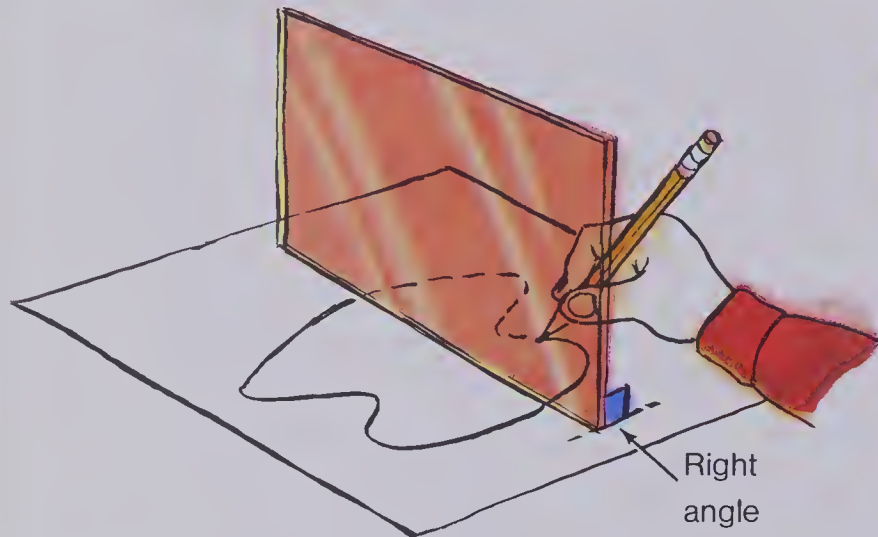
Circles move up only.

To win: Get the squares where the circles are and the circles where the squares are.



Mirrors

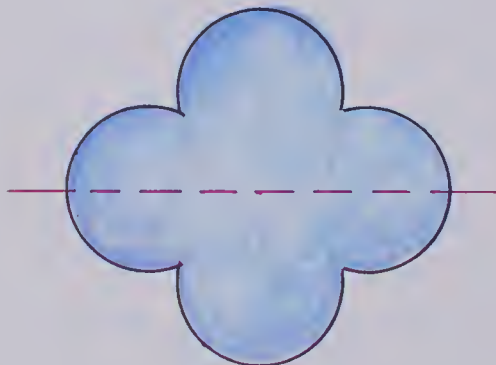
We can use a transparent plastic mirror to draw flips.



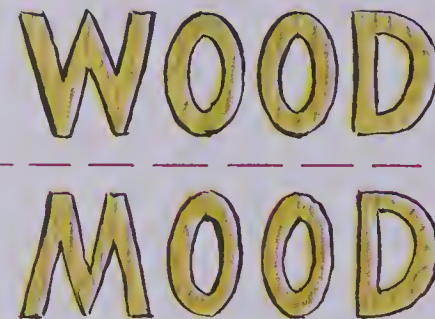
Exercises

1. Place a transparent plastic mirror on the line of symmetry. Match the patterns.

(a)



(b)



2. Trace each shape. Use a transparent mirror to complete the mirror pattern.





Tune Up

Add.

1. $23.4 + 4.569 + 632.5$

2. $356.1 + 0.374 + 6.28$

Subtract.

3. $324.5 - 16.2$

4. $62.456 - 8.39$

Add.

5. $\frac{2}{5} + \frac{1}{10}$

6. $\frac{1}{2} + \frac{1}{4}$

Subtract.

7. $\frac{7}{10} - \frac{1}{2}$

8. $\frac{3}{4} - \frac{1}{2}$

Complete.

9. $\frac{1}{5} = \frac{\blacksquare}{10}$

10. $\frac{1}{3} = \frac{\blacksquare}{12}$

11. $\frac{1}{4} = \frac{\blacksquare}{20}$

12. $\frac{2}{5} = \frac{\blacksquare}{15}$

Multiply.

13. 234×56

14. 256.3×1.8

Divide.

15. $23 \overline{)456}$

16. $36 \overline{)3456}$

Change to a decimal.

17. 50%

18. 75%

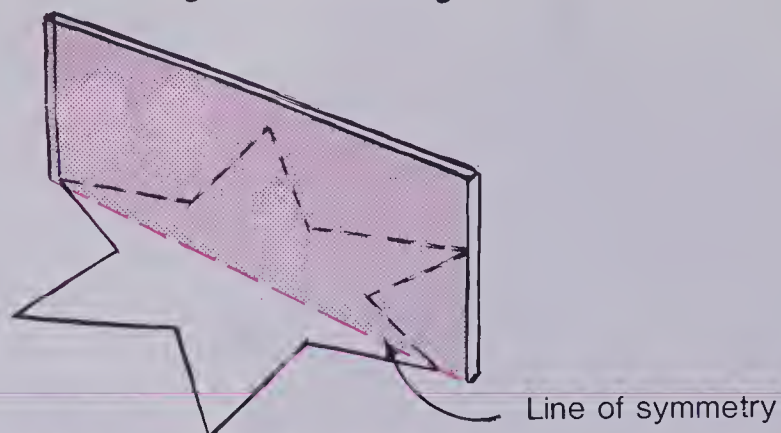
Find.

19. 20% of 80

20. 60% of 50

Lines of Symmetry

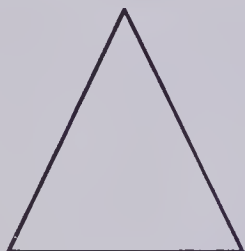
We can use a transparent mirror to draw all the lines of symmetry on certain shapes.



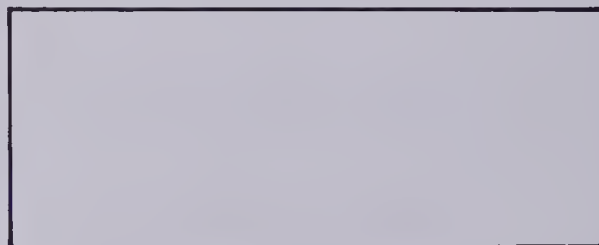
Exercises

Trace each shape. Use a transparent mirror to draw the lines of symmetry. Some shapes have more than one and some have none.

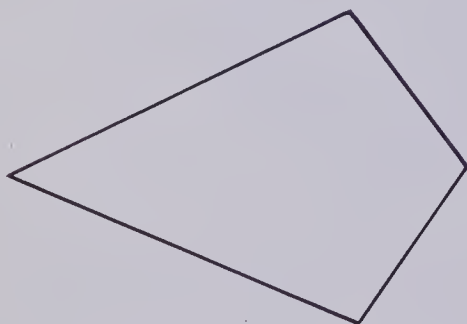
1.



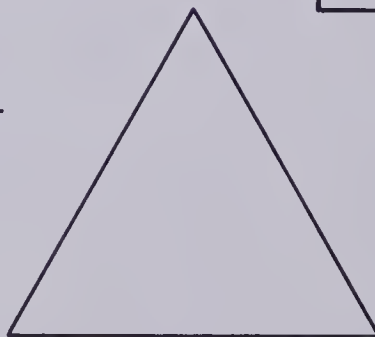
2.



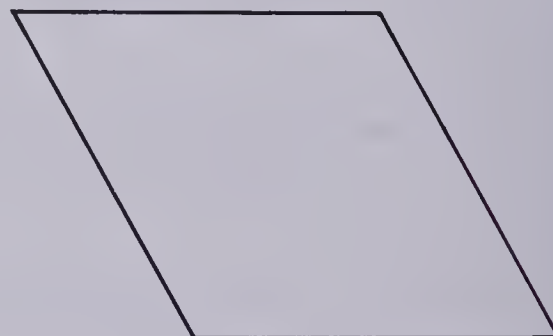
3.



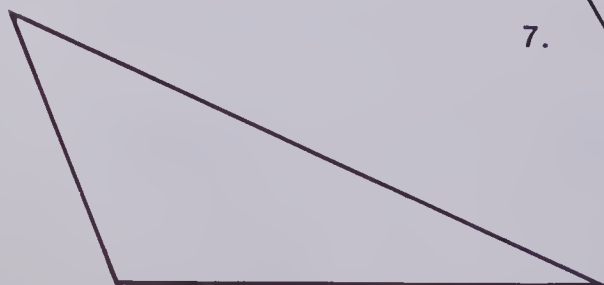
4.



5.



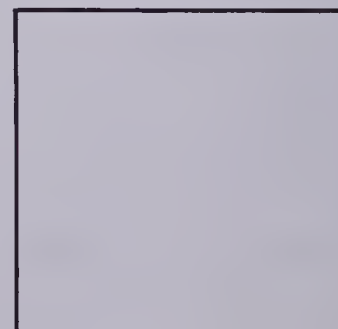
6.



7.

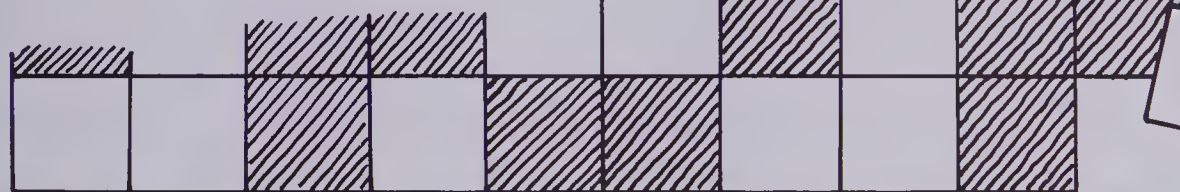


8.



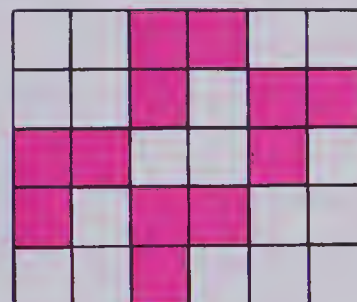
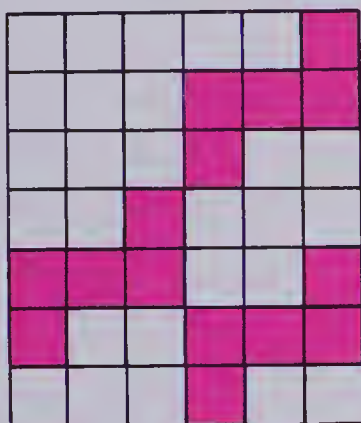
The Flooring Contractor

This worker is installing tiles.
The tiles must produce a
repeating pattern.



Exercises

1. Draw this pattern in the middle of a 12×12 square grid. Complete the grid using this pattern throughout.
2. Repeat Exercise 1 using this pattern.

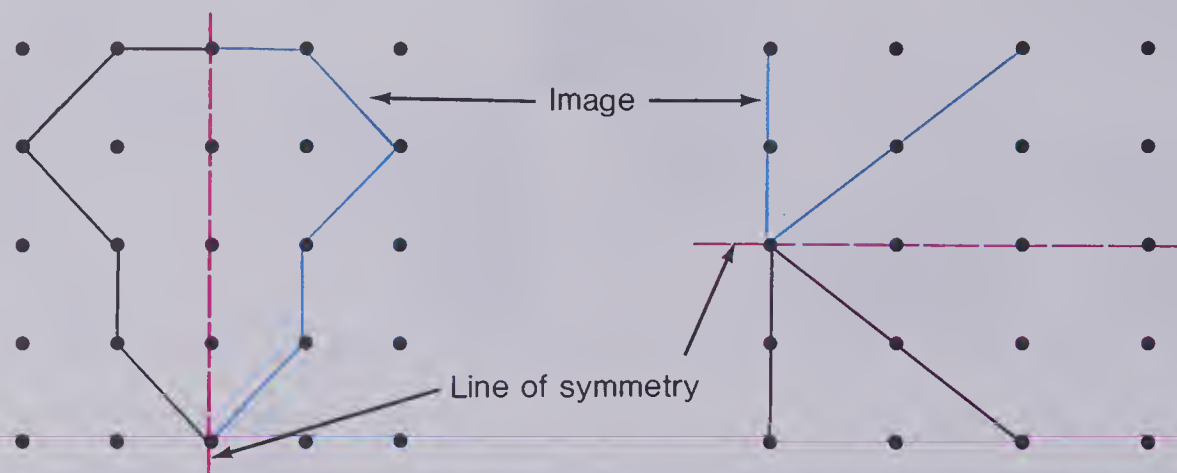


3. Make up a small pattern similar to that in Exercise 1.
Give it to a classmate to use to tile a 12×12 grid.

4. Sergio helped a customer find the cost of tiles for a new floor.
Sergio knew that 35 cartons of tiles were needed.
Each carton cost \$32.58.
How much would all the tiles cost?
5. Agnes was trying to find the cost of tiles for an office.
The office was rectangular in shape and was 9 m by 11 m.
Each carton of tiles covered four square metres.
How many cartons should Agnes order?

Completing Symmetric Shapes

Each symmetric shape has been completed.

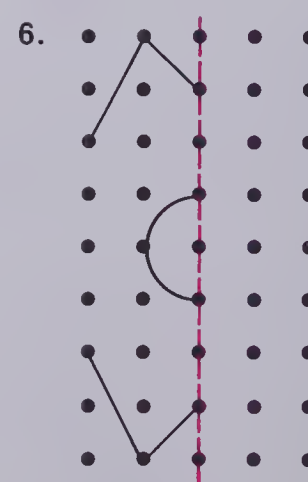
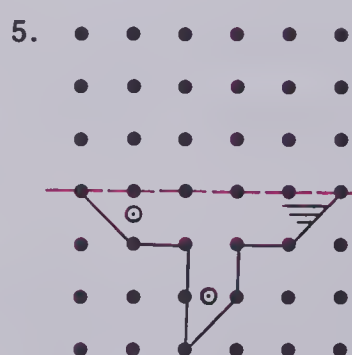
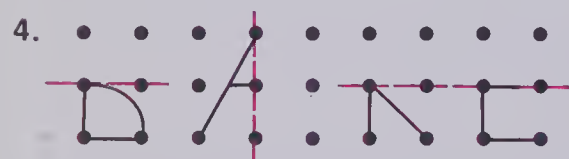
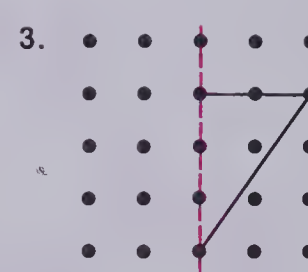
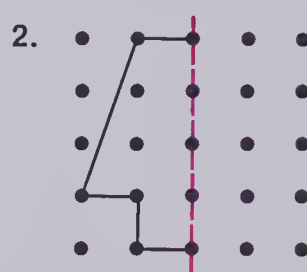
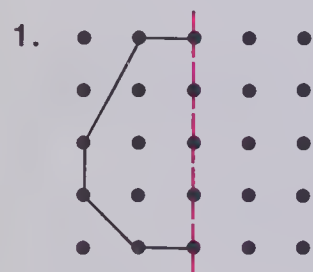


Exercises

Copy each on dot paper.

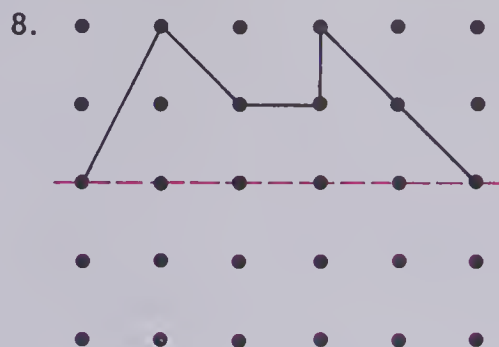
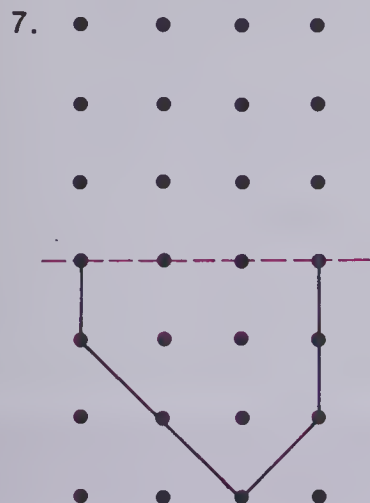
Complete the other half to make a symmetrical shape.

Check each by using a transparent mirror.



Copy and complete the other half to make a symmetrical shape.

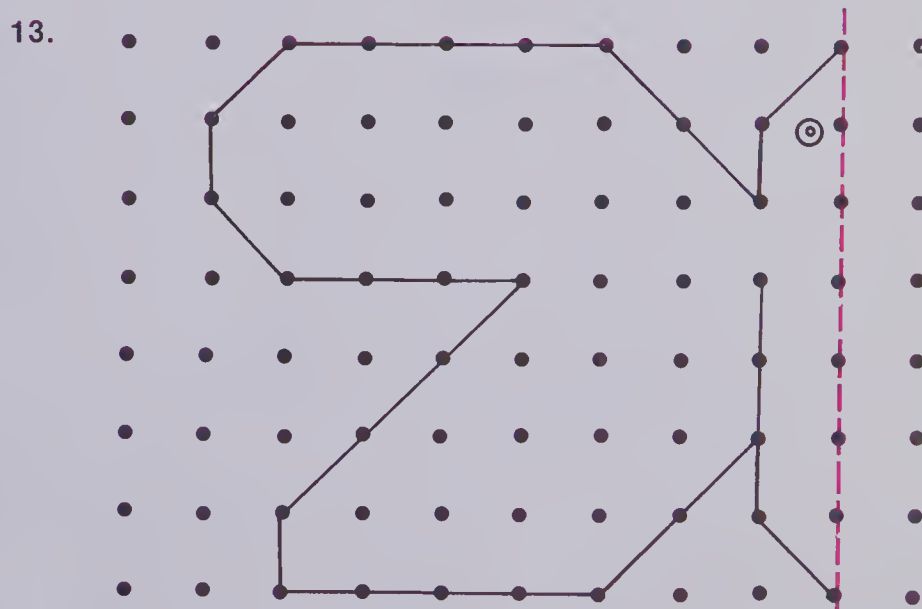
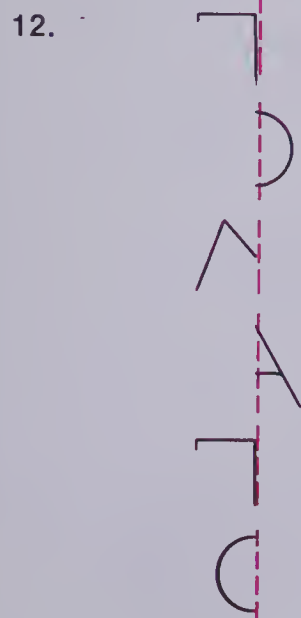
Check using a transparent mirror.



10. Make words for your friends to complete by flips.

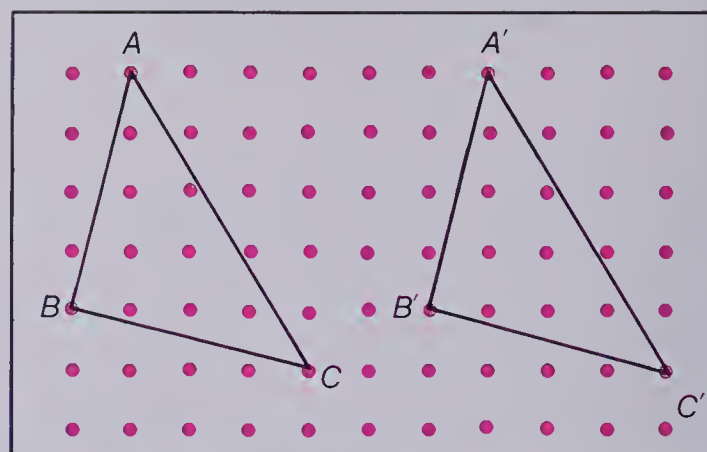
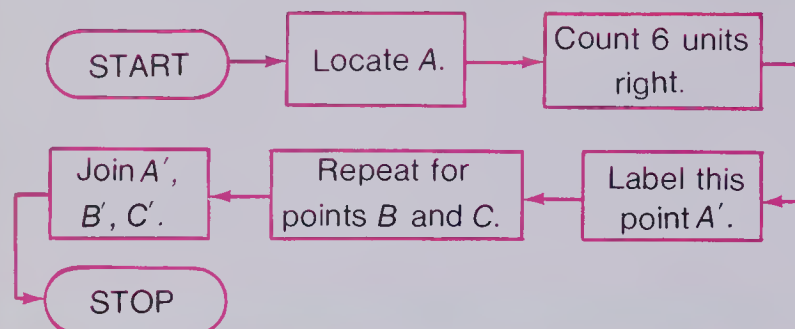
Trace these.

Complete by drawing the flip images.



Slides

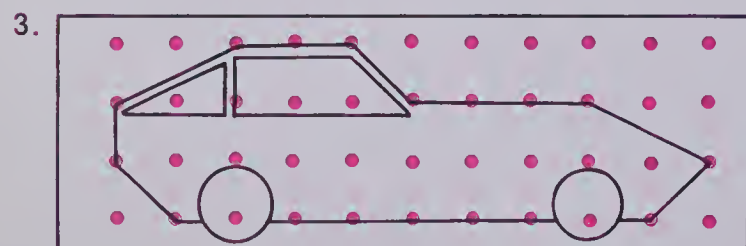
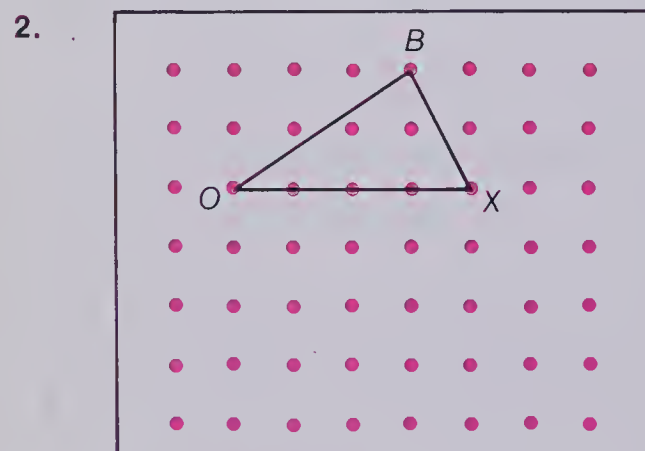
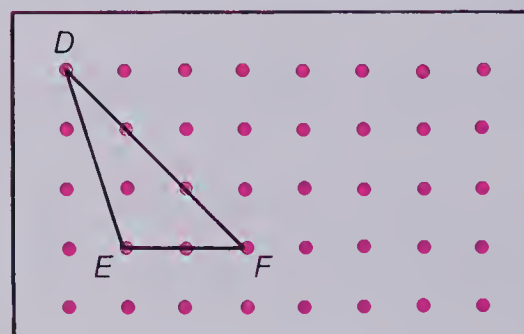
Slide $\triangle ABC$ right 6 units.



A figure and its slide image are **congruent**.

Exercises

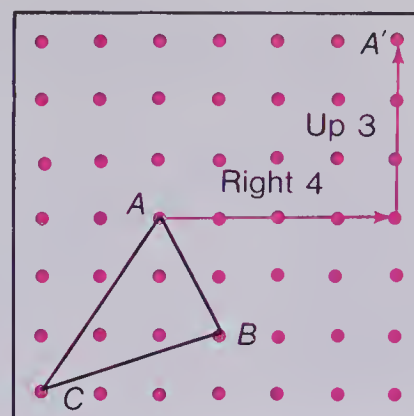
- Copy this triangle on dot paper.
 - Slide $\triangle DEF$ 4 units right.
 - Name the image $\triangle D'E'F'$.
 - Exchange with a classmate to check the slide.



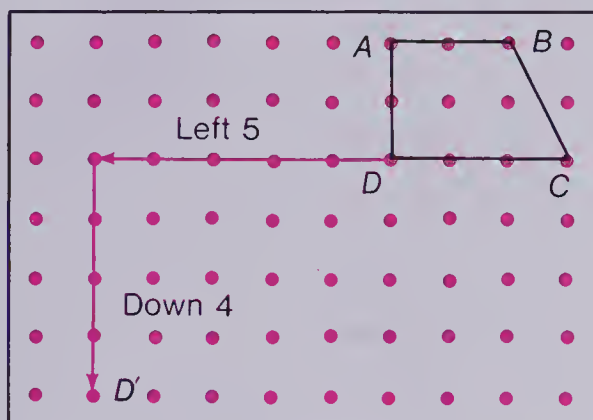
Copy this triangle on dot paper.
Slide the triangle 3 units down.
Label the image $B'O'X'$.
Exchange to check.
Is $\triangle BOX$ congruent to $\triangle B'O'X'$?

Make this car on dot paper.
Slide the car 10 units right.
Is the new car congruent to the original car?

4. We can slide a triangle right and then up.
Slide $\triangle ABC$ right 4 units and up 3 units.
Copy on dot paper and complete the slide.



5.

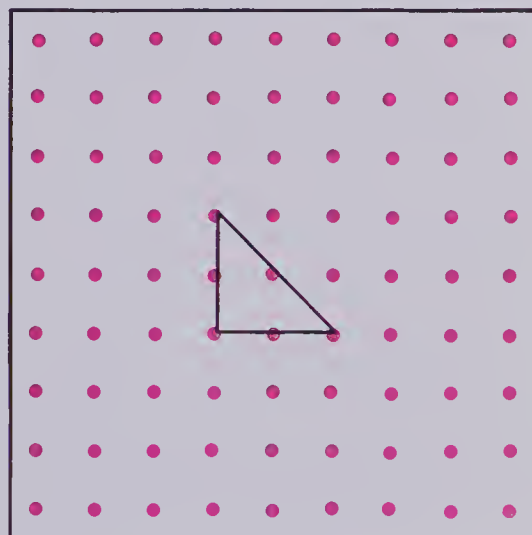


Slide $ABCD$ left 5 units and down 4 units.

6. Place a triangle in the middle of your dot paper.
Draw each slide on the same sheet.
- Right 3, up 2. Colour it red.
 - Left 3, down 3. Colour it blue.
 - Left 3, up 1. Colour it yellow.
 - Right 2, down 2. Colour it green.

Hint:

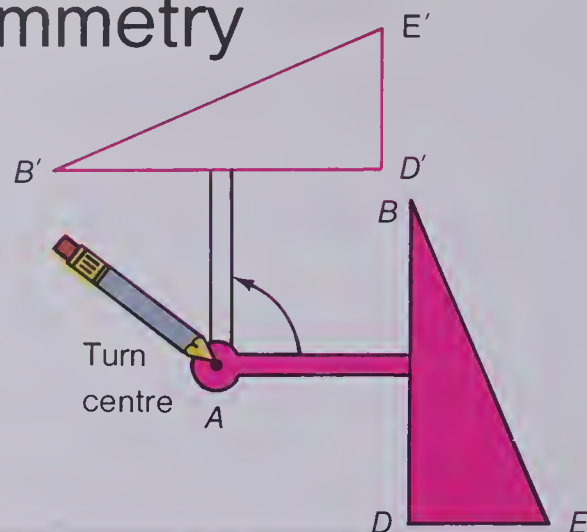
Start from the original triangle each time.



- ★ 7. Design a shape in the middle of a sheet of dot paper.
Make 4 slide images.
Write slide directions for each slide.

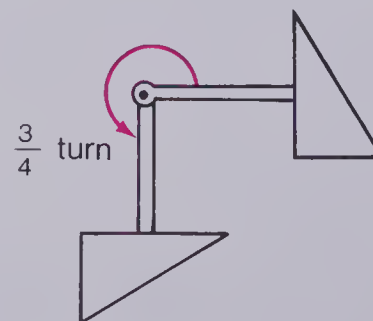
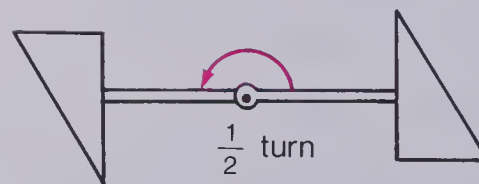
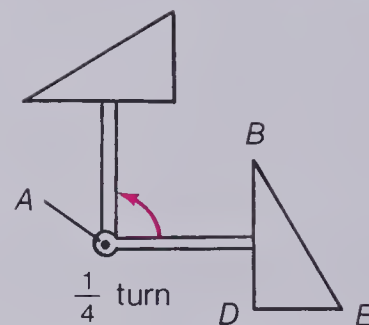
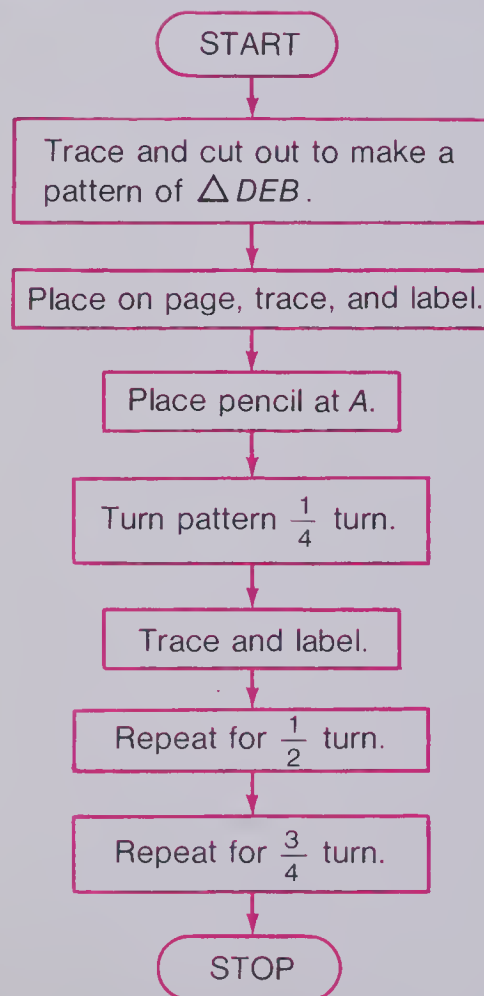
Rotational Symmetry

Toni made the red cutout.
He placed a pencil at A.
He turned the cutout $\frac{1}{4}$ turn.
 $\triangle DEB$ is congruent to $\triangle D'E'B'$.



Exercises

1.

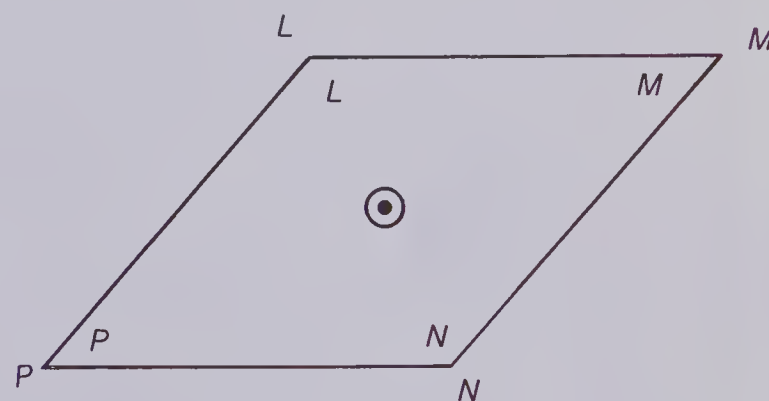
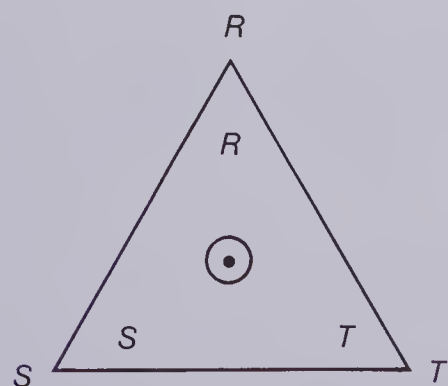
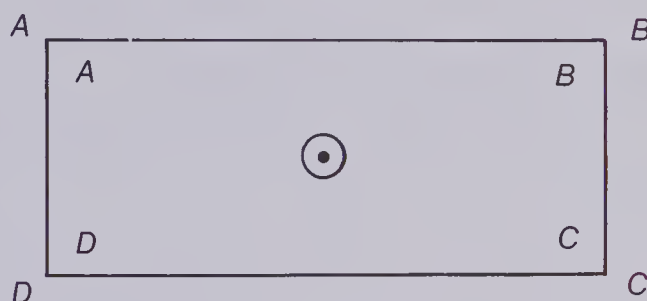
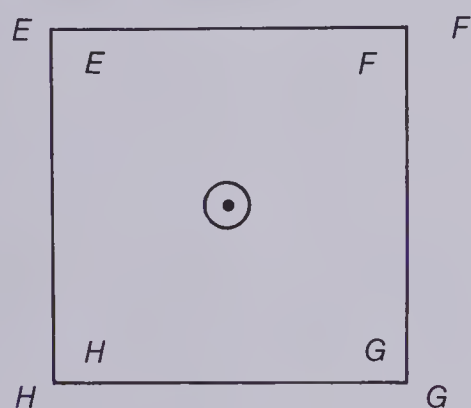


The complete pattern shows **rotational symmetry**.

2. Use a tracing of "Somersault Jack".
Repeat the steps in Exercise 1.
Colour the patterns.



3. Trace and make a cutout of the square $EHGF$. Place it on the shape on this page.
Put your pencil on the turn centre.
- In one full turn, how many times does it match the original shape?
 - Repeat the exercise for the rectangle, the triangle, and the rhombus.



4. Which shapes match their own outlines
- twice in a full turn?
 - three times in a full turn?
 - four times in a full turn?

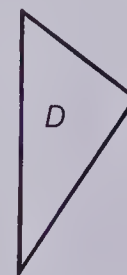
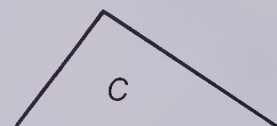
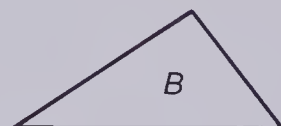
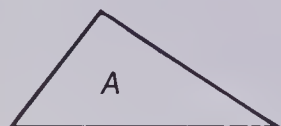
Matching Shapes

Leo is matching shape *A* with each shape on the right.

Shape *A* fits shape *B* by a flip.

Shape *A* fits shape *C* by a slide.

Shape *A* fits shape *D* by a turn.



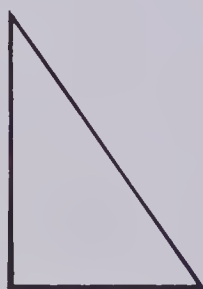
Use cutouts to check.

Exercises

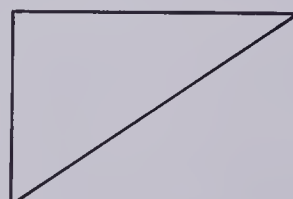
Which shape does the first one match?

Do you need to slide, flip, or turn to make each fit?

1.



A

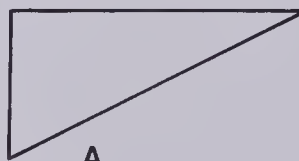
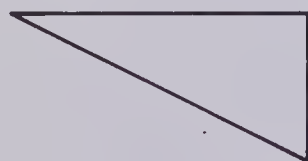


B

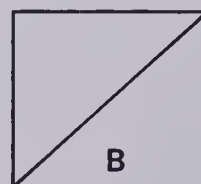


C

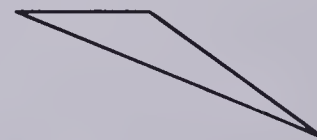
2.



A

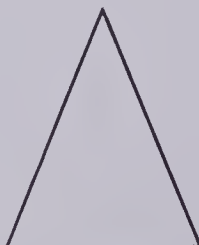


B



C

3.



A



B



C

Trace the first shape. Cut it out.

Tell whether a slide, turn, or flip of the cutout is necessary to match each of the others.

4.				
		A	B	C
5.				
		A	B	C
6.				
		A	B	C
7.				
		A	B	C

Tune Up

Multiply.

1. 3×10

4. 25×10

7. 20×30

2. 5×100

5. 36×100

8. 30×40

3. 6×1000

6. 41×1000

9. 50×70

Divide.

10. $300 \div 10$

13. $2500 \div 10$

16. $400 \div 20$

11. $5000 \div 100$

14. $56\,000 \div 100$

17. $800 \div 20$

12. $7000 \div 1000$

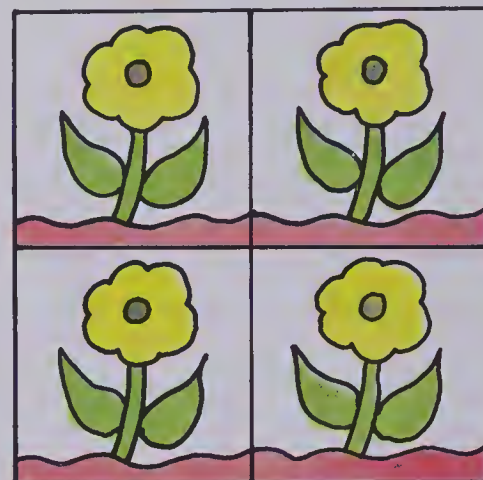
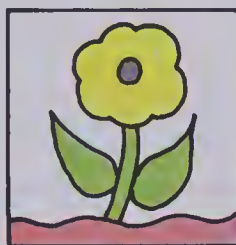
15. $72\,000 \div 1000$

18. $2500 \div 50$



Making Wallpaper Patterns

We can make wallpaper patterns using slides.



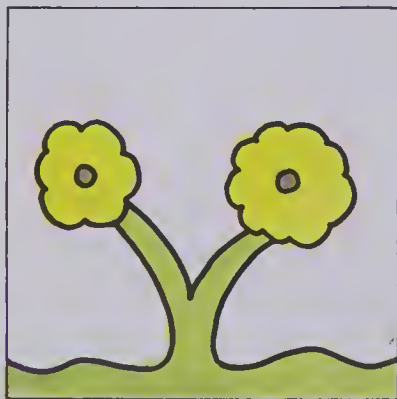
Exercises

Trace and cut out each shape.

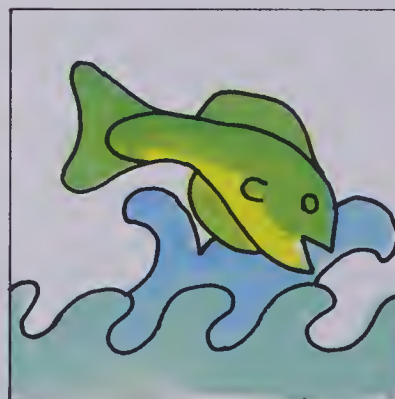
Then use it to make a wallpaper pattern using slides.

Use grid paper.

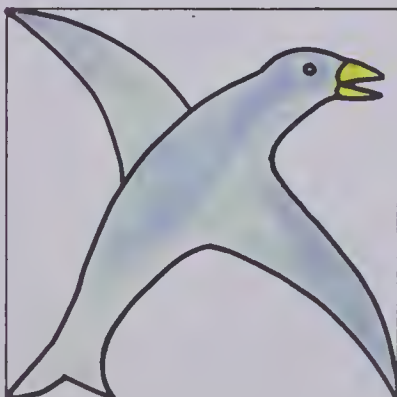
1.



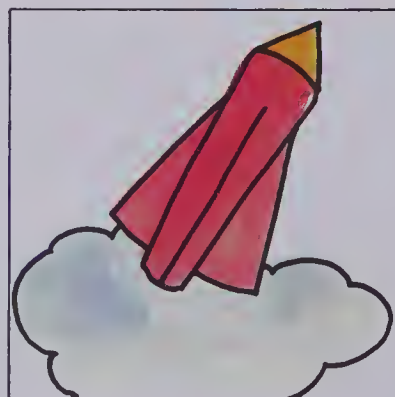
2.

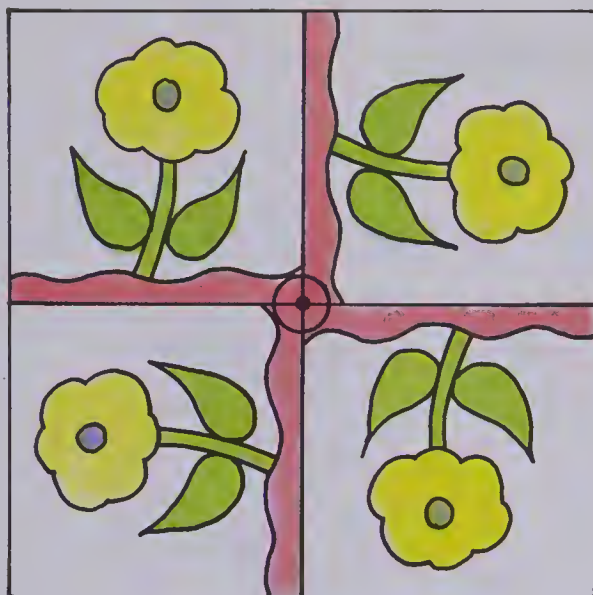


3.

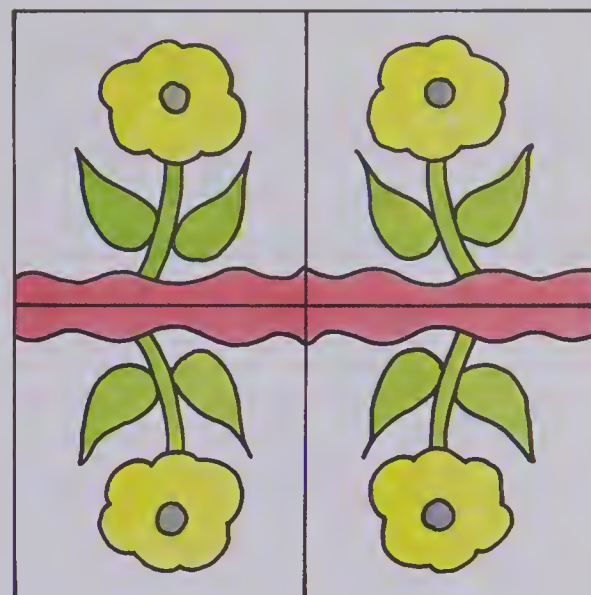


4.



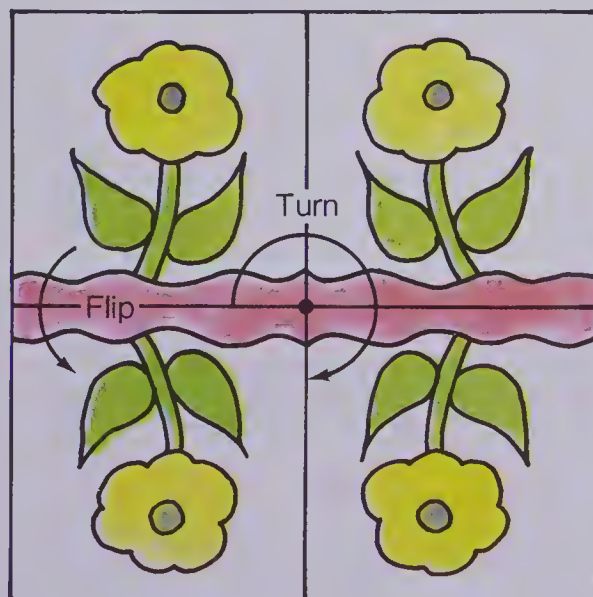


We can use turns to make wallpaper patterns.

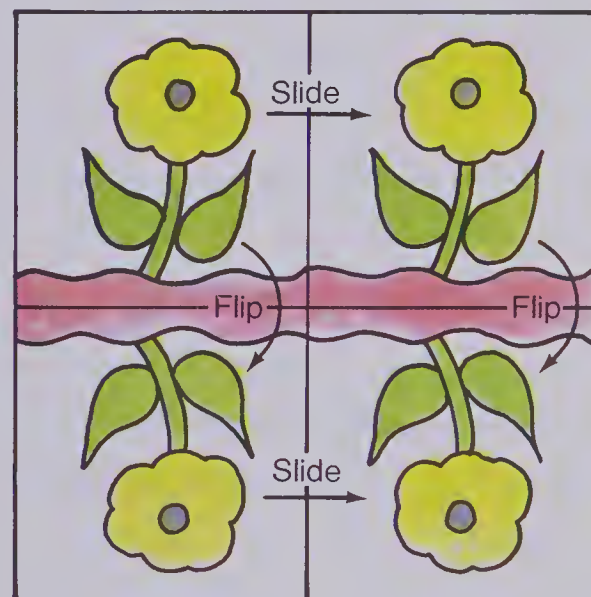


We can use flips to make wallpaper patterns.

5. Use the shapes on Page 312 to make patterns using
 - (a) flips
 - (b) turns.
6. We can combine the slides, turns, and flips to make wallpaper patterns.

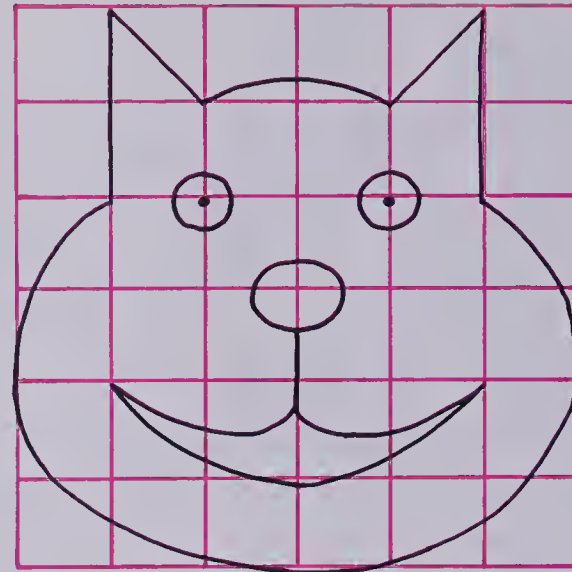
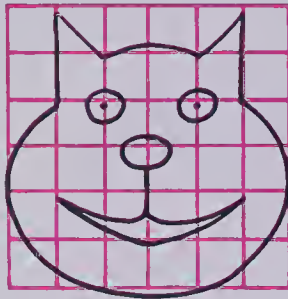


Make wallpaper patterns using combinations.



Drawing Enlargements

Tara saw this small pattern in a book.
She wanted to draw it larger.
She used a grid with larger squares.



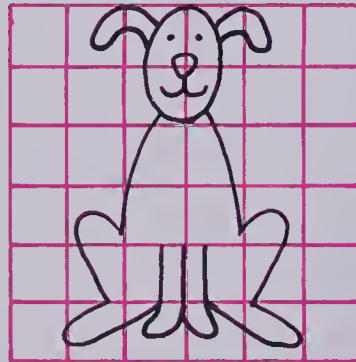
Exercises

Use Tara's method to enlarge each picture.

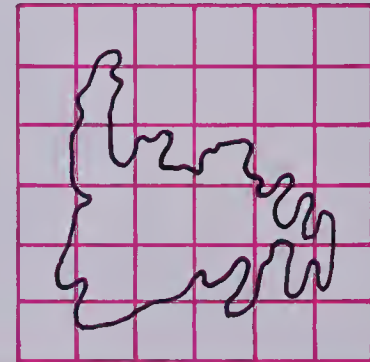
1.



2.



3.



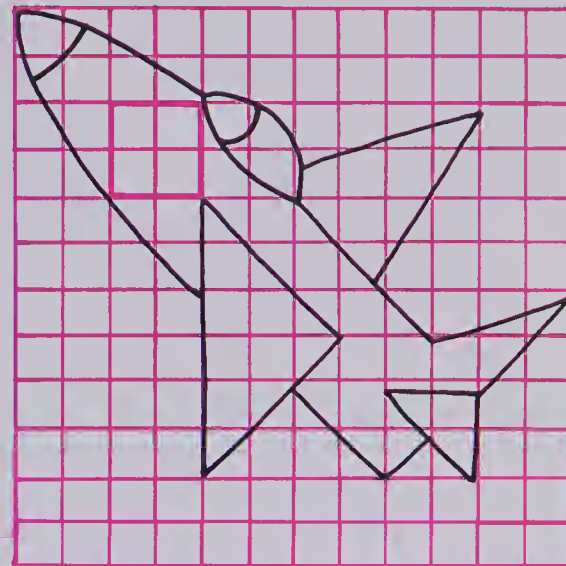
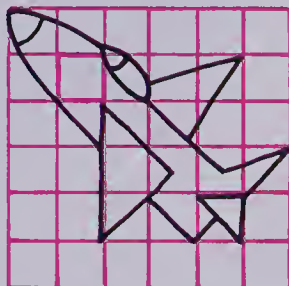
4. Use small grid paper.
Draw a pattern.
Have a classmate make a larger
copy.

BRAINTICKLER

Use 8 straight lines.
Draw 3 squares each of a different
size.

More Enlargements

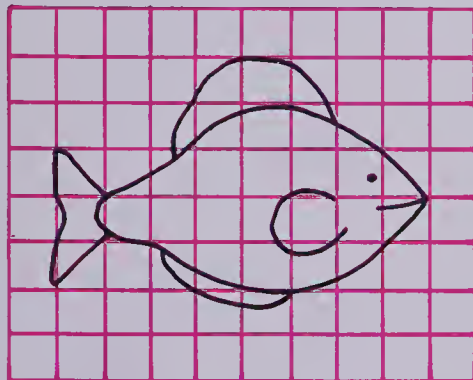
Tanya only had grid paper the same size as the patterns.
Notice how she made her patterns larger.



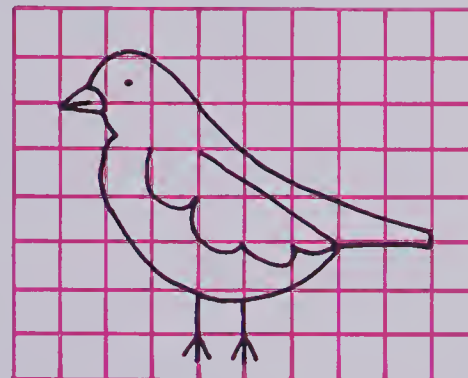
Exercises

Use the method Tanya did to make each picture twice as large.

1.



2.



3.

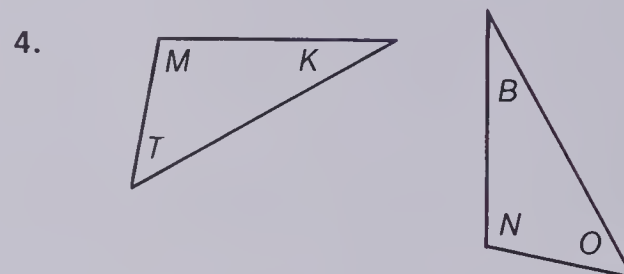
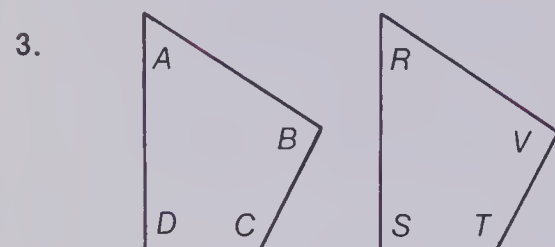
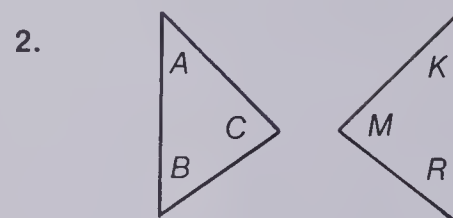
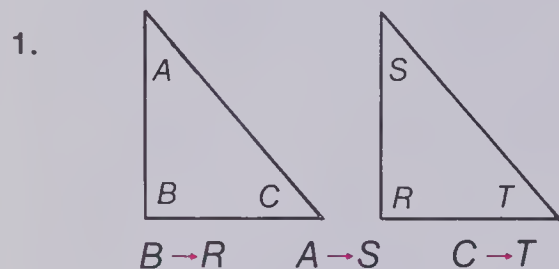


4. Use grid paper.
Draw a pattern or design.
Give it to a classmate to draw
twice as large.

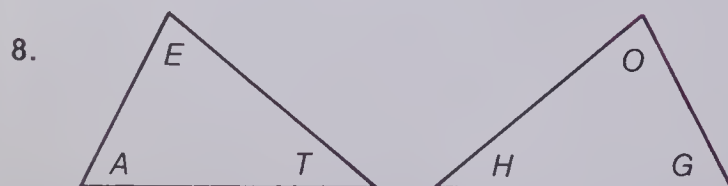
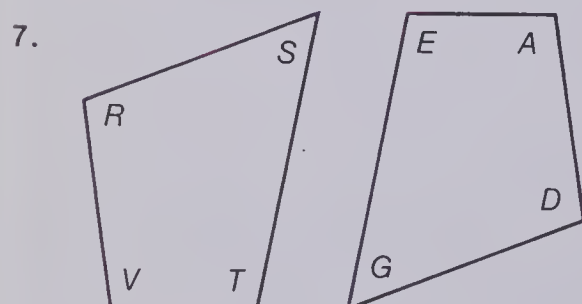
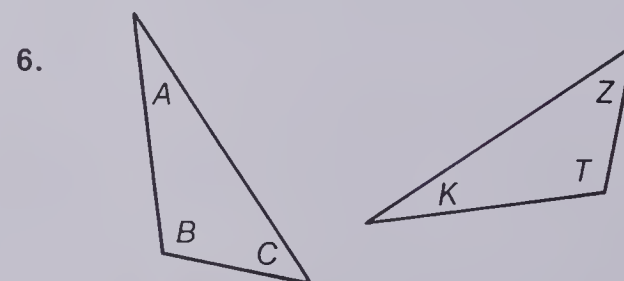
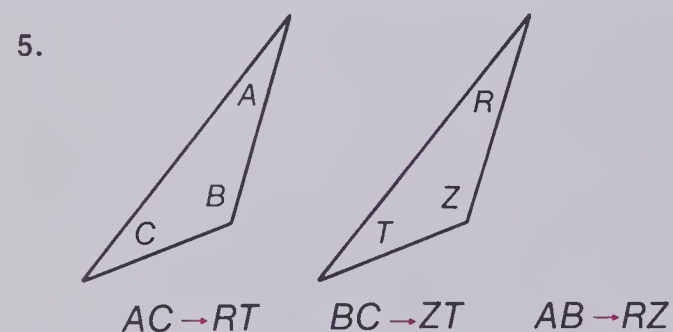
Matching Parts

Identify the matching vertices.

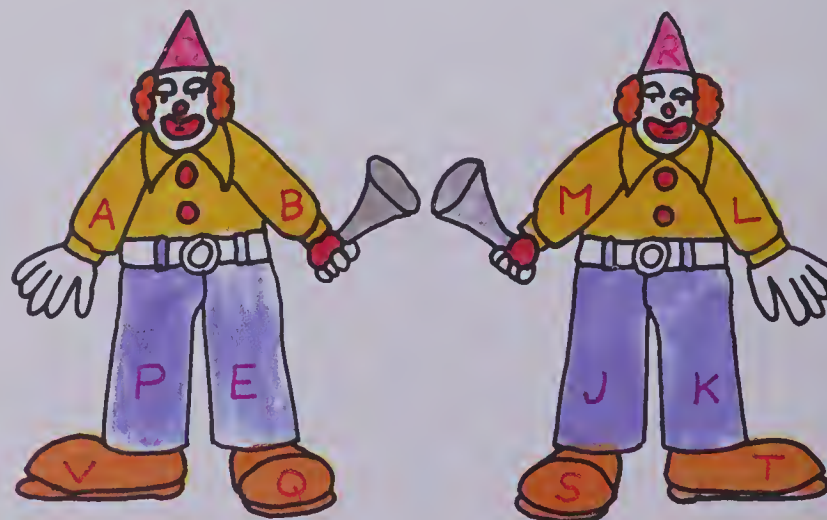
Hint: Trace, cut out, and match.



Identify the matching sides. If necessary, use the hint above.



9. Identify matching parts of the Twin Clowns.

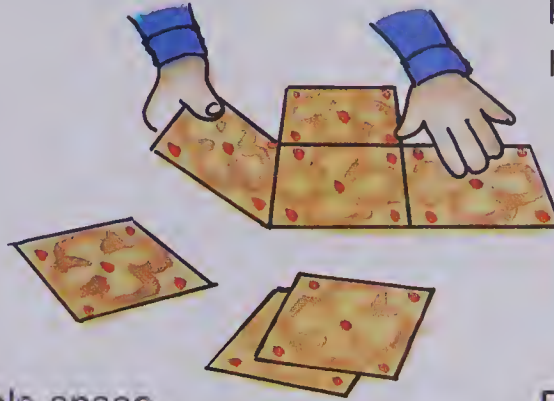


Tiles

Lonnie had tiles of this shape.
He put them together.



Lonnie's tiles covered the whole space.



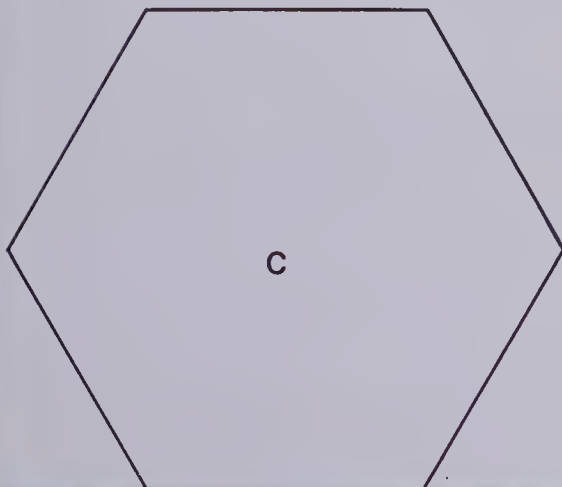
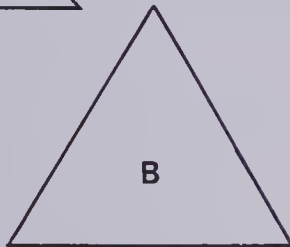
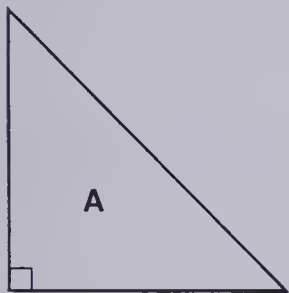
Reg had tiles of this shape.
He put them together.



Reg's tiles left holes in the pattern.

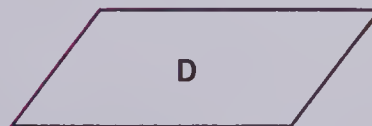
Exercises

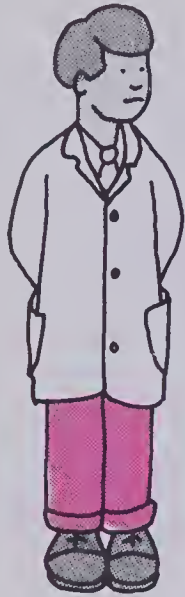
Work with classmates.



12 × 12 cm square

1. Use triangles like **A**.
Fit them on this square.
Can you cover this square
without leaving any holes?
Do not overlap the triangles.
2. Repeat Exercise 1 using
Figure **B**, Figure **C**, Figure **D**,
and Figure **E**.





Physical Therapist



Physical therapists help people who have been disabled by illnesses or accidents.

1. Ms. Forban kept records of patients treated.
In January she treated 153, in February she treated 224, in March she treated 188, and in April she treated 243.
What was the average number of patients she treated per month?
2. John received treatments for an injured back.
He spent 30 min/d for 5 d under treatment.
How many hours was he under treatment?
3. After a severe accident, Jill had to learn to walk again.
Holding a special rail, she walked 15 m each day for 3 weeks.
How far did she walk?
4. Mrs. Sherbach, a physical therapist, went to school for additional training.
She attended classes 4.5 h/d for a 5 d week for 10 weeks.
How many hours of classes did she attend?
- ★ 5. Mr. Henry helped a patient to walk.
The first week the patient walked 10 m each day.
Each week the patient increased the distance by 10 m.
How far was the patient walking after 12 weeks?

Practice

Calculate.

1. $3.4 + 4.65 + 62.3 + 0.07$

2. $329\,454.6 + 764\,564.44 + 674.6$

3. $234\,567.6 - 41\,162.67$

4. $500.6 - 18.48$

5. 72×32.4

6. 73.4×56.2

7. 60.4×0.03

8. 3144×0.34

9. 1642×0.78

10. 476.4×0.8

11. $4 \overline{)6.4}$

12. $8 \overline{)21.6}$

13. $7 \overline{)94.5}$

14. $9 \overline{)9.63}$

15. $22 \overline{)46.2}$

16. $23 \overline{)52.9}$

17. $56 \overline{)1.68}$

18. $41 \overline{)373.1}$

Use short division. Express remainders as fractions.

19. $9 \overline{)108}$

20. $6 \overline{)233}$

21. $7 \overline{)709}$

22. $8 \overline{)61.6}$

Calculate.

23. $8 \times 6 + 4$

24. $45 - 6 \times 6$

25. $8 \times 6 \div 4 + 5$

26. $6 - 2 \times 3 + 4 \div 2$

27. $40 + 5 \times 5 + 12 \div 6$

28. $5 \times (3 + 2) - (8 \div 2)$

29. $27 - (2 \times 5) - (4 + 2)$

Copy and complete.

30. $7\text{ m} = \blacksquare\text{ cm}$

31. $3\text{ km} = \blacksquare\text{ m}$

32. $2\text{ t} = \blacksquare\text{ kg}$

$2.3\text{ m} = \blacksquare\text{ cm}$

$1.5\text{ km} = \blacksquare\text{ m}$

$1.5\text{ t} = \blacksquare\text{ kg}$

33. $5000\text{ g} = \blacksquare\text{ kg}$

34. $300\text{ dm} = \blacksquare\text{ m}$

35. $5\text{ kL} = \blacksquare\text{ L}$

$3400\text{ g} = \blacksquare\text{ kg}$

$150\text{ dm} = \blacksquare\text{ m}$

$2.3\text{ kL} = \blacksquare\text{ L}$

Calculate where possible.

36. 6×1

37. $7 \div 7$

38. 16×0

39. $23 + 0$

40. $4 \div 0$

41. 51×0

42. 1×91

43. $33 - 0$

44. $5 \times (6 + 3)$

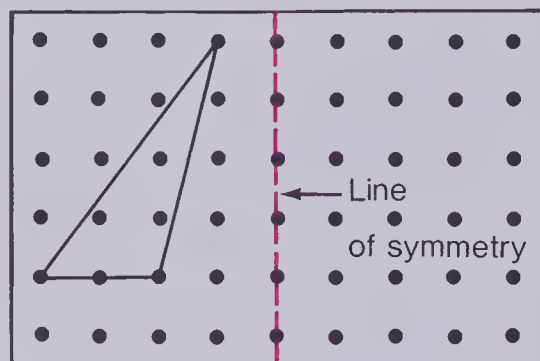
45. $44 \times (9 - 1)$

46. $0 \div 8$

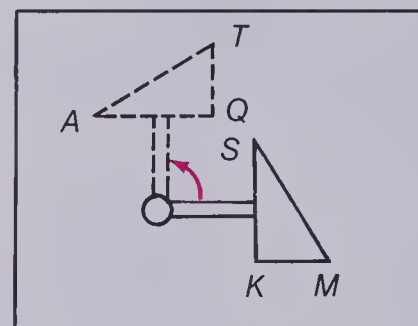
47. 0×99

Chapter Test

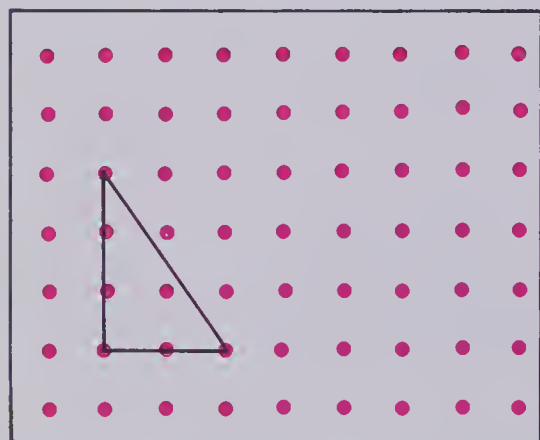
1. Use dot paper. Copy.
Make a flip pattern.



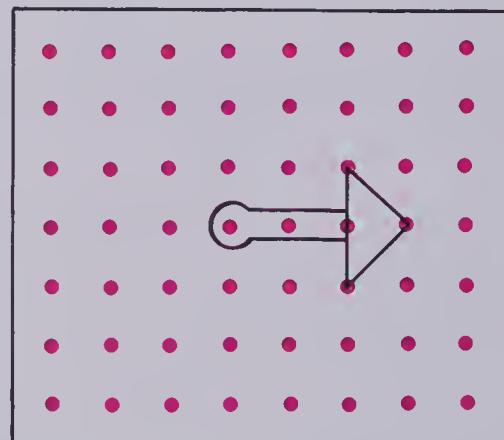
2. This is a turn pattern.
Name the matching vertices.



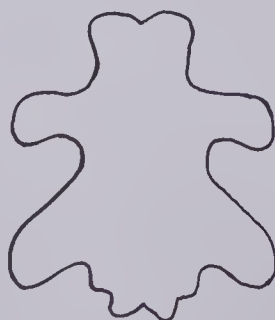
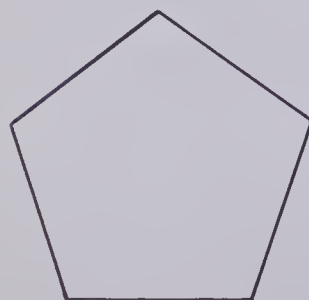
3. Copy and draw the slide right 3, up 2.



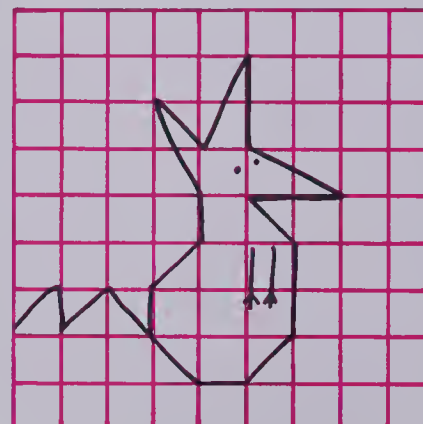
4. Copy and draw a $\frac{1}{2}$ turn.



5. Copy and draw the lines of symmetry on each.



6. Make this pattern larger using squared paper.



Cumulative Review

Calculate.

$$\begin{array}{r} 1. \quad 327 \\ \times 27 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 32.45 \\ \times 0.3 \\ \hline \end{array}$$

$$3. \quad 24 \overline{)1926}$$

$$4. \quad 32 \overline{)1472}$$

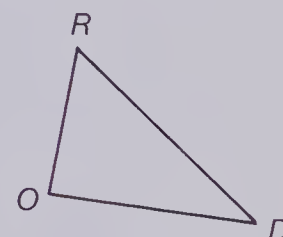
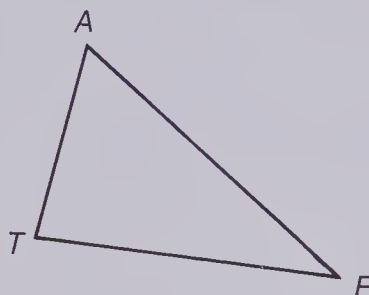
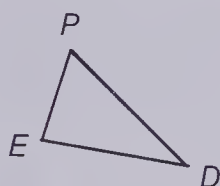
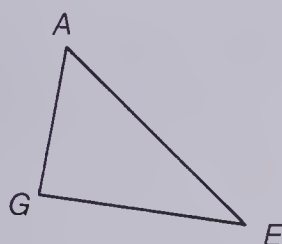
$$5. \quad 58 \div 1$$

$$6. \quad 340 \div 10$$

$$7. \quad \frac{1}{4} + \frac{1}{3}$$

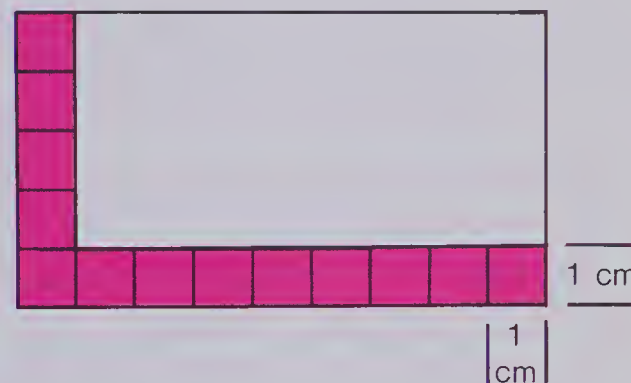
$$8. \quad \frac{4}{5} - \frac{1}{3}$$

9. Which shape is congruent to $\triangle AGE$?



10. Temperature is measured using an instrument called a and uses units called Celsius.

11. Calculate the area.



12. Draw a broken line graph for the data.

Time of Day	Temperature
06:00	8°C
09:00	16°C
12:00	20°C
15:00	22°C
18:00	14°C
21:00	10°C

13. Which numbers are prime?

2 13 16 21 3

14. Find the average of:

3.2 4.6 9.6 7.4.

15. Find 25% of 60.

Skills Check Up—Chapters 1 to 5

Give the correct answer for each: (a), (b), (c), or (d).


1.
$$\begin{array}{r} 134\ 273 \\ 403\ 614 \\ + 924\ 078 \\ \hline \end{array}$$

(a) 1 461 855
(b) 1 471 965
(c) 1 461 965
(d) 1 591 965


2.
$$\begin{array}{r} 785.27 \\ - 342.43 \\ \hline \end{array}$$

(a) 442.84
(b) 1127.70
(c) 443.24
(d) 1027.70

3. Which number completes each display?

Rule: Subtract 58.	
Enter	Display
128	70
101	43
200	

- (a) 124 (b) 142
(c) 132 (d) 158

Rule: Add 2.09.	
Enter	Display
0.10	2.19
5.82	7.91
6.25	

- (a) 8.34 (b) 4.16
(c) 7.24 (d) 9.33

Name the shape of each coloured face.

- (a) rectangle (b) square (c) circle (d) triangle



7. Choose the correct numerals for:

8 tens, 6 ones, 3 tenths, 5 hundredths, 9 thousandths.

- (a) 9536.8 (b) 8.6359 (c) 0.863 59 (d) 86.359

8. 6582 rounded to the nearest thousand is:

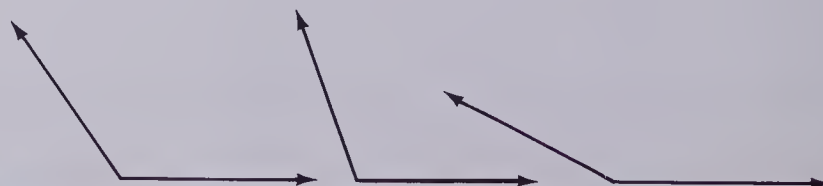
- (a) 6000 (b) 7000 (c) 6600 (d) 6580.

9. 3.447 rounded to the nearest hundredth is:

- (a) 3.547 (b) 3.457 (c) 3.45 (d) 3.44.

10. These angles are:

- (a) congruent angles (b) right angles
(c) acute angles (d) obtuse angles.



11. Which shape is a parallelogram?



12. 40×700 (a) 280 (b) 280 000
(c) 2800 (d) 28 000

13. 84×1000 (a) 84 000 (b) 80 400
(c) 8400 (d) 840 000

14.
$$\begin{array}{r} 840 \\ \times 48 \\ \hline \end{array}$$
 (a) 40 328 (b) 40 368
(c) 40 320 (d) 40 020

15.
$$\begin{array}{r} 19.43 \\ \times 0.27 \\ \hline \end{array}$$
 (a) 2.2451 (b) 5.2461
(c) 52.461 (d) 0.524 61

16. Mr. Meadows bought 3 smoke detectors.
Each detector cost \$21.95.
How much for three?

- (a) \$63.75 (b) \$64.25
(c) \$65.85 (d) \$63.85

17. 1284 eggs were sold at the market.
12 in each carton.
How many cartons?

- (a) 107 (b) 15 408 (c) 17 (d) 81

18. $583 \div 10$ (a) 5830 (b) 58.3
(c) 5.83 (d) 0.583

19. $34 \overline{)517}$ (a) 15 R7 (b) 15
(c) 18 R5 (d) 18 R7

20. $61 \overline{)4768}$ (a) 77 R19 (b) 78
(c) 78 R10 (d) 78 R30

21. $56 \overline{)8571}$ (a) 153 R3 (b) 153
(c) 153 R9 (d) 154

22. 2 km = ■ m

- (a) 20 (b) 200
(c) 2000 (d) 20 000

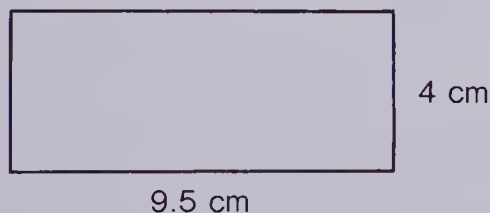
23. 4000 mL = ■ L

- (a) 4 (b) 40
(c) 400 (d) 0.4

24. 3 kg = ■ g

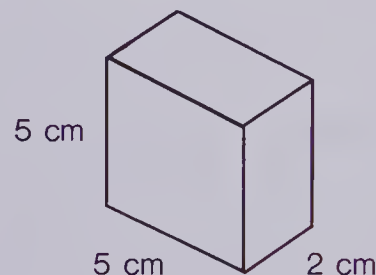
- (a) 0.3 (b) 30
(c) 300 (d) 3000

25. Find the area.



- (a) 380 cm^2 (b) 38.0 cm^2
(c) 3.8 cm^2 (d) 0.38 cm^2

26. Find the volume.

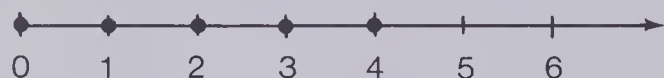


- (a) 25 cm^3 (b) 10 cm^3
(c) 27 cm^3 (d) 50 cm^3

Skills Check Up—Chapters 6 to 10

Give the correct answer for each: (a), (b), (c), or (d).

1. Which inequation does this graph show?



- (a) $3 + \blacksquare < 5$ (b) $9 + N < 14$
(c) $12 - N > 9$ (d) $2 \times \blacksquare > 10$

2. Which equation does this graph show?



- (a) $6 \times 1 = N$ (b) $13 + \blacksquare = 14$
(c) $9 - N = 0$ (d) $10 \times 0 = \blacksquare$

Which number is the correct output in each chart?

3. Rule: Multiply by 7.

Input	Output
3	21
5	35
7	\blacksquare

- (a) 42 (b) 49
(c) 14 (d) 56

4. Rule: Divide by 2 and add 3.

Input	Output
50	28
20	13
18	\blacksquare

- (a) 9 (b) 6
(c) 18 (d) 12

5. Which number is divisible by 4?

- (a) 90 (b) 114 (c) 208 (d) 403

6. Which number is divisible by 9?

- (a) 25 471 (b) 279 936
(c) 28 055 (d) 1 135 172

7. The set of factors for 32 is:

- (a) 3, 8 (b) 2, 8, 16
(c) 1, 4, 16, 32 (d) 1, 2, 4, 8, 16, 32.

8. Which number is a prime number?

- (a) 4 (b) 5 (c) 6 (d) 8

10. The prime factors of 60 are:

- (a) 1, 60 (b) 1, 2, 4, 15

9. Which number is a composite number?

- (a) 3 (b) 9 (c) 13 (d) 11

- (c) 2, 3, 2, 5 (d) 2, 3, 10.

11. 60 written as a product of its prime factors is:

- (a) 1×60 (b) $1 \times 2 \times 4 \times 15$ (c) $2 \times 3 \times 2 \times 5$ (d) $2 \times 3 \times 10$.

12. The least common multiple of 6 and 8 is:

- (a) 12 (b) 16 (c) 24 (d) 48.

14. 10 000 written in exponent form is:

13. The greatest common factor of 24 and 32 is:

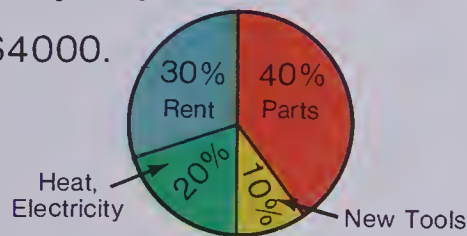
- (a) 2 (b) 8 (c) 4 (d) 16.

- (a) 10^1 (b) 10^2

- (c) 10^3 (d) 10^4 .

15. $\frac{2}{3}$ of 18 is: (a) 6 (b) 9 (c) 12 (d) 15.
17. $\frac{2}{5} + \frac{1}{4} = \blacksquare$ (a) $\frac{3}{5}$ (b) $\frac{3}{9}$ (c) $\frac{13}{20}$ (d) $\frac{9}{20}$
19. $3\frac{2}{3} + 5\frac{1}{10}$ (a) $8\frac{3}{13}$ (b) $8\frac{23}{30}$ (c) $8\frac{4}{5}$ (d) $8\frac{5}{6}$
21. $\frac{3}{5} = \frac{\blacksquare}{\blacksquare}$ (a) $\frac{7}{10}$ (b) $\frac{11}{15}$ (c) $\frac{11}{20}$ (d) $\frac{15}{25}$
16. Which fraction is greater than $\frac{3}{4}$? (a) $\frac{2}{3}$ (b) $\frac{1}{2}$ (c) $\frac{2}{8}$ (d) $\frac{4}{5}$
18. $\frac{5}{8} - \frac{1}{3} = \blacksquare$ (a) $\frac{7}{24}$ (b) $\frac{4}{5}$ (c) $\frac{23}{24}$ (d) $\frac{6}{11}$
20. $\frac{1}{2} = \frac{\blacksquare}{8}$ (a) 1 (b) 8 (c) 4 (d) 7
22. $\frac{7}{20} = \blacksquare\%$ (a) 7 (b) 70 (c) 35 (d) 14

23. The yearly expenses for "Al's Fix-it Shop" are shown in this circle graph. The total is \$4000.



How much does Al spend on rent each year?

- (a) \$1600 (b) \$1200 (c) \$120 (d) \$12 000

24. $3 \overline{)15.72}$ (a) 0.524 (b) 52.4 (c) 5.24 (d) 524
25. $(2 \times 4) \times 6 + 1 = 2 \times (\blacksquare \times 6) + 1$ (a) 2 (b) 4 (c) 6 (d) 1
26. $7 + (8 + 9) = (7 + \blacksquare) + 9$ (a) 1 (b) 7 (c) 8 (d) 9
27. $5 \times 2 + 5 \times 4 = 5 \times (2 + \blacksquare)$ (a) 5 (b) 4 (c) 2 (d) 1
28. $20 \div \blacksquare = 1$ (a) 0 (b) 1 (c) 10 (d) 20
29. $12 \div \blacksquare = 12$ (a) 0 (b) 1 (c) 6 (d) 12
30. $5 \times 12 = \blacksquare \times 5$ (a) 0 (b) 1 (c) 5 (d) 12
31. $19 + \blacksquare = 19$ (a) 0 (b) 1 (c) 19 (d) 9
32. $19 \times \blacksquare = 19$ (a) 0 (b) 1 (c) 19 (d) 9
33. $(40 - 10) \div 5 + 10 = \blacksquare$ (a) 2 (b) 16 (c) 20 (d) 28
34. $25 - 4 + 6 \times 3 = \blacksquare$ (a) 18 (b) 39 (c) 3 (d) 45
35. What is the average of these gymnastics scores?
9.6, 8.5, 7.9, 8.4, 9.0, 8.8 (a) 5.2 (b) 7.8 (c) 8.7 (d) 9.1

Extra Practice—Chapter One

Add.

- | | | | | | | | | | | |
|--------|---|-----|---|-----|---|-----|---|-----|---|-------|
| 1. (a) | $\begin{array}{r} 420 \\ 156 \\ + 387 \\ \hline \end{array}$ | (b) | $\begin{array}{r} 538 \\ 207 \\ + 164 \\ \hline \end{array}$ | (c) | $\begin{array}{r} 700 \\ 439 \\ + 295 \\ \hline \end{array}$ | (d) | $\begin{array}{r} 275 \\ 30 \\ 382 \\ + 66 \\ \hline \end{array}$ | (e) | $\begin{array}{r} 49 \\ 152 \\ 76 \\ + 290 \\ \hline \end{array}$ | 6 |
| 2. (a) | $\begin{array}{r} 4.7 \\ + 8.5 \\ \hline \end{array}$ | (b) | $\begin{array}{r} 6.2 \\ + 7.9 \\ \hline \end{array}$ | (c) | $\begin{array}{r} \$46.25 \\ + 18.06 \\ \hline \end{array}$ | (d) | $\begin{array}{r} 50.15 \\ + 46.99 \\ \hline \end{array}$ | (e) | $\begin{array}{r} 73.48 \\ + 79.15 \\ \hline \end{array}$ | 12 |
| 3. (a) | $\begin{array}{r} \$253.18 \\ + 197.56 \\ \hline \end{array}$ | (b) | $\begin{array}{r} 108.62 \\ + 357.19 \\ \hline \end{array}$ | (c) | $\begin{array}{r} \$3405.79 \\ + 5168.34 \\ \hline \end{array}$ | (d) | $\begin{array}{r} 4077.28 \\ + 3917.25 \\ \hline \end{array}$ | | | 16 |
| 4. (a) | $\begin{array}{r} 488\ 735 \\ + 206\ 180 \\ \hline \end{array}$ | (b) | $\begin{array}{r} 529\ 618 \\ + 276\ 094 \\ \hline \end{array}$ | (c) | $\begin{array}{r} 165\ 402 \\ + 38\ 719 \\ \hline \end{array}$ | (d) | $\begin{array}{r} 604\ 572 \\ + 103\ 959 \\ \hline \end{array}$ | | | 7, 21 |

5. Write numerals for each.




- (a) 2 thousands, 5 hundreds, 0 tens, 7 ones
 (b) zero decimal four six
 (c) 100 000 + 50 000 + 3000 + 200 + 90 + 3
 (d) 4 tens, 7 ones, 2 tenths, 5 hundredths, 3 thousandths
 (e) seven and thirty-eight hundredths

Subtract.

- | | | | | | | | | | | |
|--------|---|-----|---|-----|---|-----|---|-----|---|--------|
| 6. (a) | $\begin{array}{r} 7.3 \\ - 4.6 \\ \hline \end{array}$ | (b) | $\begin{array}{r} 8.0 \\ - 3.2 \\ \hline \end{array}$ | (c) | $\begin{array}{r} \$72.15 \\ - 26.83 \\ \hline \end{array}$ | (d) | $\begin{array}{r} 51.63 \\ - 38.17 \\ \hline \end{array}$ | (e) | $\begin{array}{r} 30.01 \\ - 16.52 \\ \hline \end{array}$ | 11 |
| 7. (a) | $\begin{array}{r} \$356.14 \\ - 187.03 \\ \hline \end{array}$ | (b) | $\begin{array}{r} 614.25 \\ - 527.64 \\ \hline \end{array}$ | (c) | $\begin{array}{r} \$5823.40 \\ - 1856.75 \\ \hline \end{array}$ | (d) | $\begin{array}{r} 7052.19 \\ - 2586.14 \\ \hline \end{array}$ | | | 12, 16 |
| 8. (a) | $\begin{array}{r} 607 \\ - 268 \\ \hline \end{array}$ | (b) | $\begin{array}{r} 415 \\ - 176 \\ \hline \end{array}$ | (c) | $\begin{array}{r} 700 \\ - 243 \\ \hline \end{array}$ | (d) | $\begin{array}{r} 5172 \\ - 3264 \\ \hline \end{array}$ | (e) | $\begin{array}{r} 6031 \\ - 2572 \\ \hline \end{array}$ | |
| 9. (a) | $\begin{array}{r} 622\ 571 \\ - 450\ 190 \\ \hline \end{array}$ | (b) | $\begin{array}{r} 304\ 281 \\ - 158\ 466 \\ \hline \end{array}$ | (c) | $\begin{array}{r} 761\ 910 \\ - 173\ 254 \\ \hline \end{array}$ | (d) | $\begin{array}{r} 543\ 092 \\ - 467\ 183 \\ \hline \end{array}$ | | | 21 |

Extra Practice—Chapter One

1. Copy and complete the table. 2

Rule: ?	
Enter	Display
8	21
13	26
23	36
36	
8	
10	

My rule is .

2. Round 6375.914 to the nearest:

27-28

- (a) hundredth (b) tenth
(c) one (d) ten
(e) hundred (f) thousand.

3. Write numerals for each.

14-15

- (a) three hundred fifty-five thousand, sixty
(b) $70\,000 + 3000 + 52 + 0.03$
(c) thirty-one million
(d) 5 tens, 2 tenths, 3 hundredths, 4 thousandths

4. Add.

$$\begin{array}{r} \text{(a)} \quad 6167.34 \\ + 1987.69 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(b)} \quad 502.34 \\ + 103.89 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(c)} \quad 258.1 \\ \quad 75.3 \\ + 573.6 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(d)} \quad 384 \\ \quad 86 \\ \quad 456 \\ \quad 78 \\ + 3465 \\ \hline \end{array}$$

5. Subtract.

12, 16

$$\begin{array}{r} \text{(a)} \quad 630.14 \\ - 239.86 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(b)} \quad 700.00 \\ - 116.68 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(c)} \quad 6430.56 \\ - 1431.63 \\ \hline \end{array}$$

6. Compare. Use $>$, $<$, or $=$.

17

(a) $523.46 \bullet 523.37$

(b) $62.00 \bullet 63.13$

(c) $54.567 \bullet 54.666$

(d) $7.145 \bullet 7.145$

7. There were 2351 Canada geese counted at the refuge.

27

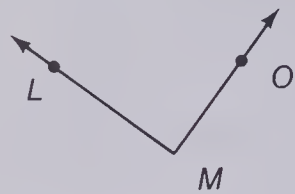
There were 3752 white geese counted.

Round to the nearest thousand to estimate the number of geese counted in all.

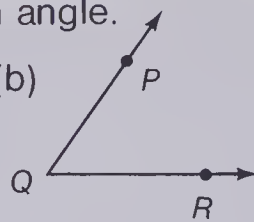
Extra Practice — Chapter Two

1. Name the vertex of each angle.

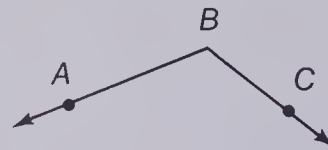
(a)



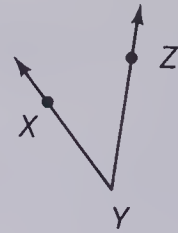
(b)



(c)



(d)



41

2. In Exercise 1 above, name each type of angle.

48

3. Use a protractor to find the measure of each angle in Exercise 1.

50

4. (a) Use compasses to draw a circle with a diameter of 6 cm.

42

- (b) What is the length of a radius of your circle?

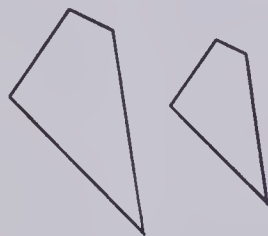
5. Use a ruler to draw a parallelogram. Label it $ABCD$.

59

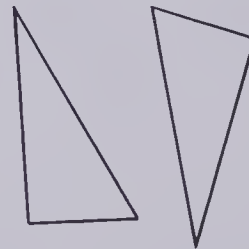
6. Are these pairs of shapes congruent? Write a statement.

52

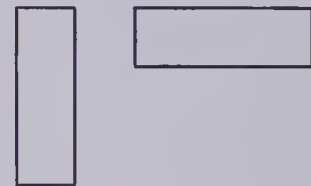
(a)



(b)



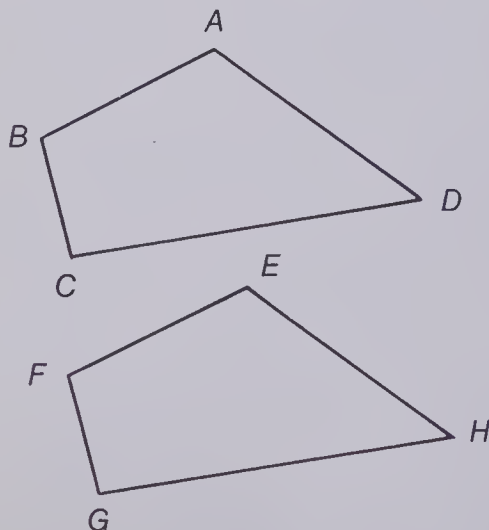
(c)



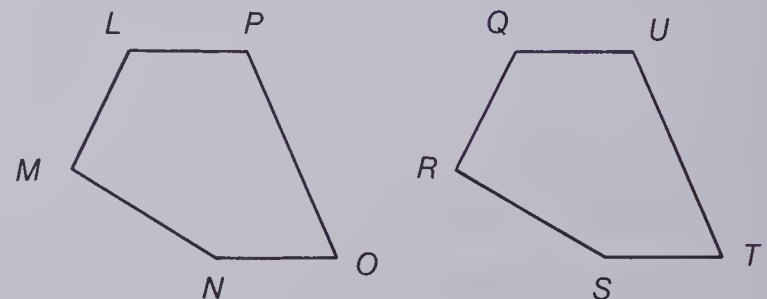
7. The polygons in each pair are congruent. They match by a slide. Name the matching vertices and sides.

54

(a)



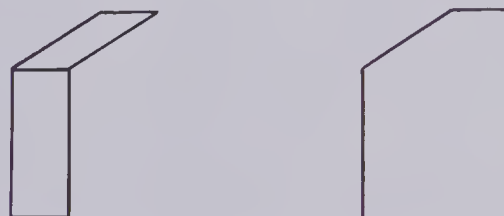
(b)



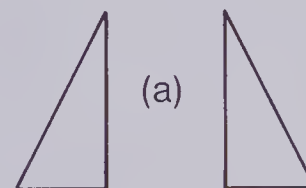
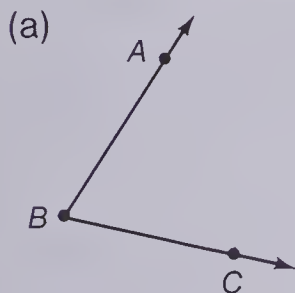
Extra Practice—Chapter Two

1. Use straws and pipe cleaners to make a model of 38
 (a) a cube (b) a rectangular prism.

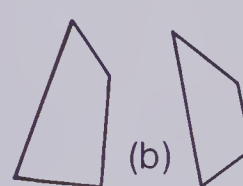
2. Trace and complete each. 39
 (a) cubes (b) rectangular prisms



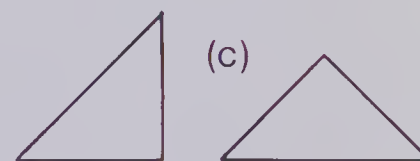
3. Name each angle two ways. 41 4. Are the polygons in each pair congruent? Yes or no. 52



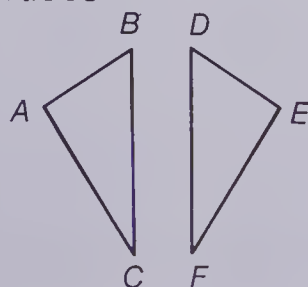
5. Use a protractor to find the measure of each angle in Exercise 3. 50



6. Name the two types of angles in Exercise 3. 48



7. Name the corresponding 54 8. 1725 polar bears. 65
 (a) vertices (b) sides.



- 6185 caribou.
 Round to the nearest thousand to estimate the difference between the number of caribou and the number of bears.

Extra Practice—Chapter Three

Multiply.

- | | | | | |
|--|---|---|--|--|
| 1. (a) 7×100 | (b) 3×10 | (c) 5×1000 ⁷⁰ | (d) 6×40 | (e) 7×500 ⁷¹ |
| 2. (a) $\begin{array}{r} 26 \\ \times 4 \\ \hline \end{array}$ | (b) $\begin{array}{r} 37 \\ \times 5 \\ \hline \end{array}$ | (c) $\begin{array}{r} 51 \\ \times 9 \\ \hline \end{array}$ ⁷³ | (d) $\begin{array}{r} 362 \\ \times 4 \\ \hline \end{array}$ | (e) $\begin{array}{r} 157 \\ \times 6 \\ \hline \end{array}$ ⁷⁴ |
| 3. (a) $\begin{array}{r} 2058 \\ \times 3 \\ \hline \end{array}$ | (b) $\begin{array}{r} 6173 \\ \times 5 \\ \hline \end{array}$ | (c) $\begin{array}{r} 4902 \\ \times 6 \\ \hline \end{array}$ | (d) $\begin{array}{r} 51\,407 \\ \times 4 \\ \hline \end{array}$ | (e) $\begin{array}{r} 30\,816 \\ \times 7 \\ \hline \end{array}$ ⁷⁵ |
| 4. (a) $\begin{array}{r} 0.8 \\ \times 2 \\ \hline \end{array}$ | (b) $\begin{array}{r} 4.6 \\ \times 3 \\ \hline \end{array}$ | (c) $\begin{array}{r} 2.9 \\ \times 7 \\ \hline \end{array}$ ⁷⁷ | (d) $\begin{array}{r} 18.7 \\ \times 5 \\ \hline \end{array}$ | (e) $\begin{array}{r} 31.6 \\ \times 4 \\ \hline \end{array}$ ⁷⁸ |
| 5. (a) $\begin{array}{r} 2.65 \\ \times 5 \\ \hline \end{array}$ | (b) $\begin{array}{r} 71.32 \\ \times 4 \\ \hline \end{array}$ | (c) $\begin{array}{r} 410.61 \\ \times 6 \\ \hline \end{array}$ ⁷² | (d) $\begin{array}{r} 7.321 \\ \times 4 \\ \hline \end{array}$ | (e) $\begin{array}{r} 1.807 \\ \times 9 \\ \hline \end{array}$ ⁸² |
| 6. (a) $\begin{array}{r} 46 \\ \times 13 \\ \hline \end{array}$ | (b) $\begin{array}{r} 38 \\ \times 25 \\ \hline \end{array}$ | (c) $\begin{array}{r} 80 \\ \times 74 \\ \hline \end{array}$ ⁸⁵ | (d) $\begin{array}{r} 156 \\ \times 31 \\ \hline \end{array}$ | (e) $\begin{array}{r} 480 \\ \times 27 \\ \hline \end{array}$ ⁸⁶ |
| 7. (a) $\begin{array}{r} 118 \\ \times 225 \\ \hline \end{array}$ | (b) $\begin{array}{r} 407 \\ \times 132 \\ \hline \end{array}$ | (c) $\begin{array}{r} 150 \\ \times 346 \\ \hline \end{array}$ | (d) $\begin{array}{r} 286 \\ \times 107 \\ \hline \end{array}$ | (e) $\begin{array}{r} 543 \\ \times 245 \\ \hline \end{array}$ ⁸⁸ |
| 8. (a) $\begin{array}{r} 46 \\ \times 0.3 \\ \hline \end{array}$ | (b) $\begin{array}{r} 59 \\ \times 0.5 \\ \hline \end{array}$ ⁹² | (c) $\begin{array}{r} 271 \\ \times 0.6 \\ \hline \end{array}$ | (d) $\begin{array}{r} 380 \\ \times 0.4 \\ \hline \end{array}$ | (e) $\begin{array}{r} 6252 \\ \times 0.7 \\ \hline \end{array}$ ⁹³ |
| 9. (a) $\begin{array}{r} 1.24 \\ \times 0.7 \\ \hline \end{array}$ | (b) $\begin{array}{r} 23.9 \\ \times 0.5 \\ \hline \end{array}$ ⁹⁴ | (c) $\begin{array}{r} 7.08 \\ \times 0.4 \\ \hline \end{array}$ | (d) $\begin{array}{r} 4.182 \\ \times 0.3 \\ \hline \end{array}$ | (e) $\begin{array}{r} 5.209 \\ \times 0.6 \\ \hline \end{array}$ |
| 10. (a) $\begin{array}{r} 1.92 \\ \times 0.24 \\ \hline \end{array}$ | (b) $\begin{array}{r} 7.05 \\ \times 0.61 \\ \hline \end{array}$ | (c) $\begin{array}{r} 43.2 \\ \times 0.73 \\ \hline \end{array}$ | (d) $\begin{array}{r} 5.81 \\ \times 0.06 \\ \hline \end{array}$ | (e) $\begin{array}{r} 69.8 \\ \times 0.53 \\ \hline \end{array}$ ⁹⁵ |

Extra Practice—Chapter Three

Write the products.

- | | | | | |
|------------------------|--------------------|----------------------|----------------------|----|
| 1. (a) 8×8 | (b) 72×10 | (c) 50×1000 | (d) 83×100 | 70 |
| 2. (a) 70×100 | (b) 80×20 | (c) 40×300 | (d) 400×200 | 71 |

Multiply.

- | | | | | |
|---|--|--|--|-------------|
| 3. (a) $\begin{array}{r} 78 \\ \times 6 \\ \hline \end{array}$ | (b) $\begin{array}{r} 327 \\ \times 9 \\ \hline \end{array}$ | (c) $\begin{array}{r} 6051 \\ \times 4 \\ \hline \end{array}$ | (d) $\begin{array}{r} 75\,007 \\ \times 8 \\ \hline \end{array}$ | 73-75 |
| 4. (a) $\begin{array}{r} 68 \\ \times 51 \\ \hline \end{array}$ | (b) $\begin{array}{r} 90 \\ \times 68 \\ \hline \end{array}$ | (c) $\begin{array}{r} 543 \\ \times 49 \\ \hline \end{array}$ | (d) $\begin{array}{r} 206 \\ \times 378 \\ \hline \end{array}$ | 85
86-88 |
| 5. (a) $\begin{array}{r} 4.3 \\ \times 8 \\ \hline \end{array}$ | (b) $\begin{array}{r} 52.3 \\ \times 6 \\ \hline \end{array}$ | (c) $\begin{array}{r} 406.86 \\ \times 7 \\ \hline \end{array}$ | (d) $\begin{array}{r} 5.147 \\ \times 8 \\ \hline \end{array}$ | |
| 6. (a) $\begin{array}{r} 61 \\ \times 0.6 \\ \hline \end{array}$ | (b) $\begin{array}{r} 58 \\ \times 0.9 \\ \hline \end{array}$ | (c) $\begin{array}{r} 308 \\ \times 0.7 \\ \hline \end{array}$ | (d) $\begin{array}{r} 5044 \\ \times 0.4 \\ \hline \end{array}$ | 92
93 |
| 7. (a) $\begin{array}{r} 2.1 \\ \times 0.6 \\ \hline \end{array}$ | (b) $\begin{array}{r} 17.47 \\ \times 0.5 \\ \hline \end{array}$ | (c) $\begin{array}{r} 4.709 \\ \times 0.7 \\ \hline \end{array}$ | (d) $\begin{array}{r} 70.8 \\ \times 0.24 \\ \hline \end{array}$ | 94-95 |

8. There are 567 bags of rice.
Each bag is 1.5 kg.
How many kilograms of rice altogether?

9. A merchant bought 9 leather coats.
Each coat sold for \$176.55.
How much did the merchant pay altogether?

Extra Practice — Chapter Four

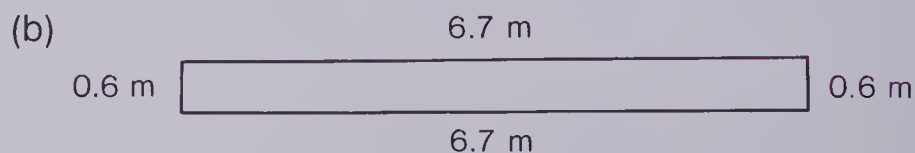
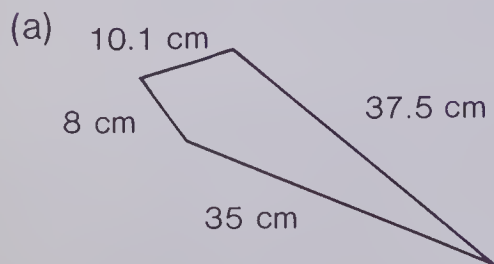
Divide.

1. (a) $4 \overline{)68}$ (b) $7 \overline{)98}$ (c) $3 \overline{)75}$ (d) $6 \overline{)84}$ (e) $5 \overline{)85}$ 104
2. (a) $6 \overline{)258}$ (b) $5 \overline{)215}$ (c) $7 \overline{)196}$ (d) $4 \overline{)148}$ (e) $8 \overline{)216}$
3. (a) $4 \overline{)852}$ (b) $7 \overline{)952}$ (c) $5 \overline{)625}$ (d) $6 \overline{)816}$ (e) $3 \overline{)942}$ 105
4. (a) $7 \overline{)1064}$ (b) $5 \overline{)1725}$ (c) $4 \overline{)1484}$ (d) $6 \overline{)1506}$ (e) $9 \overline{)1287}$ 106
5. (a) $700 \div 10$ (b) $5000 \div 100$ (c) $100 \div 10$ (d) $325 \div 10$ (e) $4689 \div 1000$ 107

Multiply.

6. (a) 300×0.1 (b) 529×0.01 (c) 1000×0.1 (d) 924×0.01 (e) 6000×0.1 108
7. Copy and complete. 110, 119, 120, 122, 126
 - (a) $200 \text{ cm} = \blacksquare \text{ m}$ (b) $6 \text{ m} = \blacksquare \text{ dm}$ (c) $10 \text{ dm} = \blacksquare \text{ cm}$
 - (d) $2000 \text{ m} = \blacksquare \text{ km}$ (e) $500 \text{ mL} = \blacksquare \text{ L}$ (f) $6500 \text{ g} = \blacksquare \text{ kg}$
 - (g) $5 \text{ t} = \blacksquare \text{ kg}$ (h) $2 \text{ d} = \blacksquare \text{ min}$ (i) $\blacksquare \text{ d} = 1 \text{ a}$

8. Calculate the perimeter of these shapes. 116



Extra Practice — Chapter Four

Write the quotients.

- | | | | | |
|-----------------------|--------------------|--------------------|---------------------|-----|
| 1. (a) $72 \div 8$ | (b) $8000 \div 10$ | (c) $356 \div 10$ | (d) $18 \div 1$ | |
| 2. (a) $1000 \div 10$ | (b) $63 \div 9$ | (c) $888 \div 100$ | (d) $306 \div 1000$ | 107 |

Divide.

- | | | | | |
|----------------------------|--------------------------|--------------------------|--------------------------|-----|
| 3. (a) $4 \overline{)96}$ | (b) $5 \overline{)405}$ | (c) $8 \overline{)208}$ | (d) $7 \overline{)364}$ | 105 |
| 4. (a) $3 \overline{)942}$ | (b) $6 \overline{)2430}$ | (c) $8 \overline{)4096}$ | (d) $7 \overline{)5656}$ | 106 |

5. Copy and complete.

110, 119, 120, 122, 126

- | | | |
|--|--|--|
| (a) $100 \text{ cm} = \blacksquare \text{ m}$ | (b) $1 \text{ km} = \blacksquare \text{ m}$ | (c) $1 \text{ cm} = \blacksquare \text{ mm}$ |
| (d) $2000 \text{ mL} = \blacksquare \text{ L}$ | (e) $5 \text{ t} = \blacksquare \text{ kg}$ | (f) $200 \text{ cm} = \blacksquare \text{ dm}$ |
| (g) $1 \text{ leap year} = \blacksquare \text{ d}$ | (h) $2 \text{ h} = \blacksquare \text{ min}$ | (i) $5 \text{ min} = \blacksquare \text{ s}$ |

6. Write as centimetres.

- (a) $3 \text{ m} + 3 \text{ dm} + 5 \text{ cm} + 3 \text{ mm}$
 (b) $10 \text{ m} + 0 \text{ dm} + 8 \text{ cm} + 4 \text{ mm}$

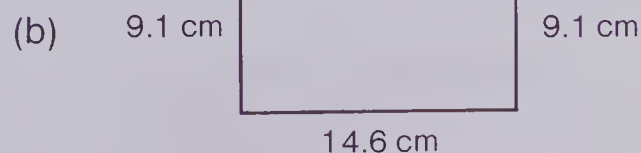
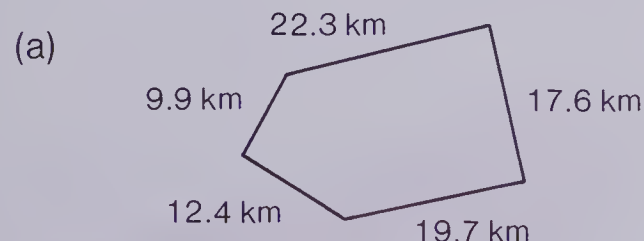
7. Write as metres.

- (a) $8 \text{ m} + 0 \text{ dm} + 4 \text{ cm}$
 (b) $3 \text{ m} + 5 \text{ dm} + 0 \text{ cm} + 9 \text{ mm}$

8. Estimate each in the unit indicated.

- | | |
|---|---|
| (a) 1 small spoon (in millilitres) | (b) height of the classroom ceiling (in metres) |
| (c) width of your thumbnail (in centimetres) | |
| (d) distance around your schoolground (in kilometres) | |

9. Calculate the perimeter.



10. Tom has 6 cans of oil.

Altogether there is 3000 mL.

How many millilitres of oil in each can?

11. Linda puts 0.5 mL of oil in each litre of gasoline for her motorbike. She has 6 L of gasoline. How much oil does she need?

Extra Practice — Chapter Five

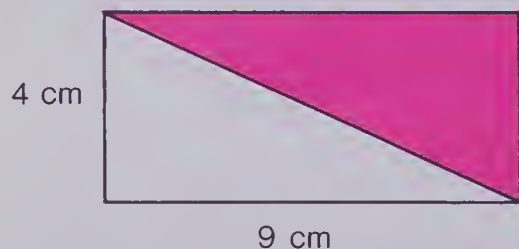
Divide.

1. (a) $6 \overline{)240}$ (b) $250 \div 5$ (c) $7 \overline{)210}$ (d) $320 \div 8$ (e) $4 \overline{)360}$
2. (a) $23 \overline{)161}$ (b) $31 \overline{)248}$ (c) $29 \overline{)203}$ (d) $41 \overline{)246}$ (e) $37 \overline{)296}$ ¹³⁶
3. (a) $27 \overline{)1431}$ (b) $34 \overline{)2278}$ (c) $42 \overline{)2394}$ (d) $51 \overline{)2397}$ (e) $39 \overline{)1131}$
4. (a) $25 \overline{)450}$ (b) $32 \overline{)768}$ (c) $21 \overline{)714}$ (d) $36 \overline{)936}$ (e) $28 \overline{)476}$ ¹³⁹
5. (a) $34 \overline{)4352}$ (b) $22 \overline{)3806}$ (c) $29 \overline{)4118}$ (d) $43 \overline{)5375}$ (e) $54 \overline{)7074}$
6. (a) $4 \overline{)424}$ (b) $7 \overline{)742}$ (c) $23 \overline{)4761}$ (d) $31 \overline{)6355}$ (e) $26 \overline{)7852}$ ¹⁴¹

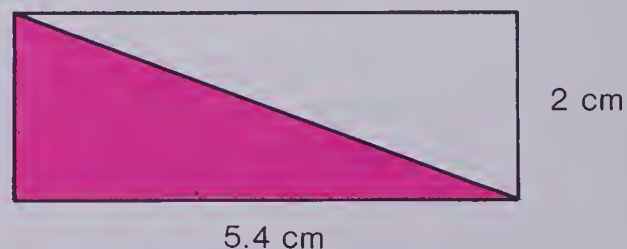
Divide. Watch for remainders.

7. (a) $27 \overline{)218}$ (b) $34 \overline{)221}$ (c) $43 \overline{)752}$ (d) $26 \overline{)419}$ (e) $33 \overline{)915}$
8. (a) $43 \overline{)1092}$ (b) $26 \overline{)1127}$ (c) $33 \overline{)5012}$ (d) $28 \overline{)7321}$ (e) $38 \overline{)5798}$ ¹⁴⁵
9. Calculate the area of each rectangle. Then find the area of the coloured triangle. ¹⁵⁶

(a)



(b)



10. Calculate the volume of a small box that is 21.5 cm wide, 28 cm long, and 6.5 cm high. ¹⁶⁰

Extra Practice—Chapter Five

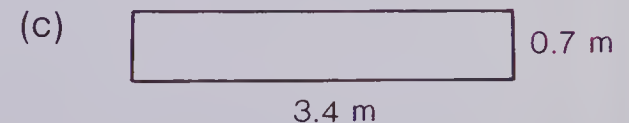
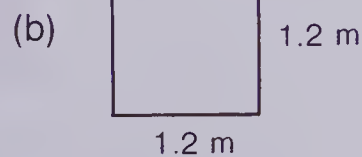
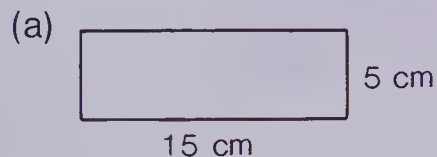
Divide.

- | | | | | |
|------------------------------|---------------------------|---------------------------|---------------------------|-----|
| 1. (a) $40 \div 10$ | (b) $90 \div 30$ | (c) $400 \div 50$ | (d) $240 \div 60$ | |
| (e) $160 \div 40$ | (f) $630 \div 70$ | (g) $350 \div 50$ | (h) $810 \div 90$ | 134 |
| 2. (a) $22 \overline{)66}$ | (b) $31 \overline{)186}$ | (c) $43 \overline{)301}$ | (d) $52 \overline{)468}$ | |
| (e) $71 \overline{)426}$ | (f) $83 \overline{)332}$ | (g) $34 \overline{)272}$ | (h) $62 \overline{)558}$ | 136 |
| 3. (a) $27 \overline{)162}$ | (b) $38 \overline{)266}$ | (c) $77 \overline{)308}$ | (d) $69 \overline{)207}$ | 137 |
| (e) $66 \overline{)462}$ | (f) $89 \overline{)712}$ | (g) $48 \overline{)240}$ | (h) $39 \overline{)312}$ | |
| 4. (a) $23 \overline{)144}$ | (b) $48 \overline{)340}$ | (c) $78 \overline{)500}$ | (d) $96 \overline{)690}$ | 145 |
| 5. (a) $31 \overline{)651}$ | (b) $46 \overline{)2990}$ | (c) $56 \overline{)1288}$ | (d) $73 \overline{)3285}$ | |
| (e) $45 \overline{)5535}$ | (f) $42 \overline{)2016}$ | (g) $29 \overline{)1334}$ | (h) $46 \overline{)6486}$ | 139 |
| 6. (a) $41 \overline{)4141}$ | (b) $38 \overline{)7638}$ | (c) $52 \overline{)5616}$ | (d) $27 \overline{)8127}$ | 141 |
| (e) $54 \overline{)5995}$ | (f) $33 \overline{)7333}$ | (g) $29 \overline{)9310}$ | (h) $19 \overline{)1940}$ | 145 |

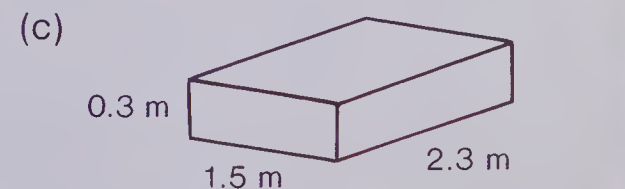
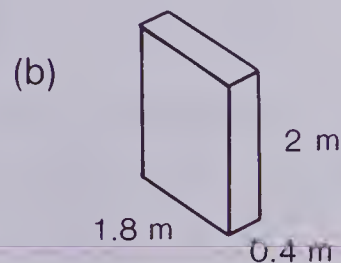
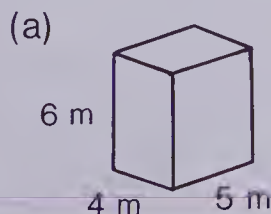
7. Divide and check each.

- | | | | | |
|-------------------------|-------------------------|---------------------------|---------------------------|---------|
| (a) $7 \overline{)147}$ | (b) $6 \overline{)130}$ | (c) $64 \overline{)1472}$ | (d) $31 \overline{)3164}$ | 144-146 |
|-------------------------|-------------------------|---------------------------|---------------------------|---------|

8. Calculate the area.



9. Calculate the volume.



Extra Practice—Chapter Six

1. Make the sentences true by using $<$, $>$, or $=$.

(a) $8 + 7 \bullet 11$

(b) $19 - 3 \bullet 16$

(c) $5 \times 8 \bullet 59$

166-167

(d) $64 \div 8 \bullet 8$

(e) $23 + 9 \bullet 34$

(f) $26 - 17 \bullet 19$

2. Solve each inequation. Then graph the solutions on a whole number line.

(a) $N + 7 < 10$

(b) $11 > N + 5$

(c) $4 \times N < 19$

168

3. (a) Which room sold the most chocolate bars? the fewest?

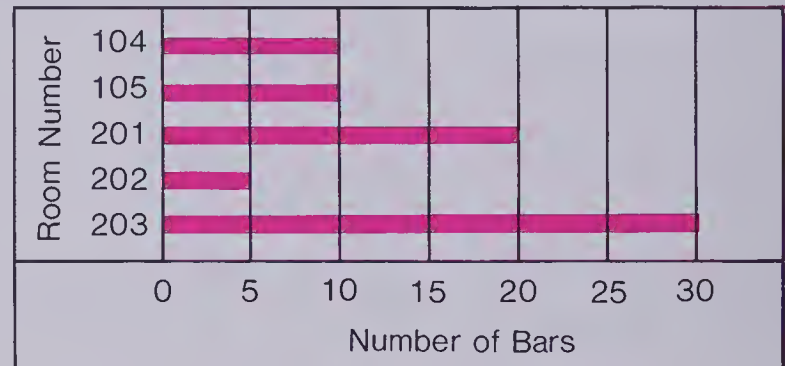
(b) Which room sold half the number as Room 105?

(c) Which rooms sold the same number?

(d) The chocolate bars cost \$1.25 each.
How much money did each room collect?
How much money was collected altogether?

Chocolate Bar Sales —
Maple St. School

179

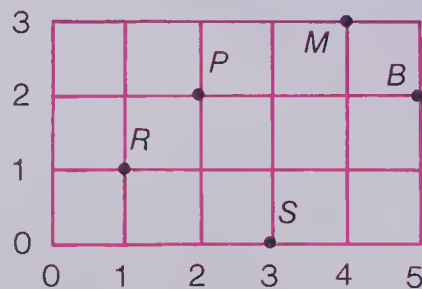


4. Copy and complete the table.
Rule: Multiply by 3 and add 4.

Input	Output
2	
4	
5	
7	
9	

185

5.



What letter is identified by:

190-191

(a) $(2, 2)$?

(b) $(5, 2)$?

(c) $(1, 1)$?

(d) $(4, 3)$?

(e) $(3, 0)$?

Extra Practice—Chapter Six

Solve.

1. (a) $6 + \blacksquare = 26$

(b) $8 \times T = 48$

(c) $18 + \blacksquare = 25$

165

(d) $25 \div \blacksquare = 5$

(e) $28 - N = 20$

(f) $D \div 5 = 2$

2. (a) $N < 4$

(b) $6 > T$

(c) $9 - 6 > N$

166

3. Graph the solutions on a number line.

(a) $4 + N = 12$

(b) $6 - 3 > N$

(c) $M < 4$

167

Use the rule to complete the table.

4. Rule: Multiply by 3 and add 5.

Input	1	2	5	10
Output				

5. Rule: Divide by 3 and subtract 4.

Input	30	21	15	12
Output				

185

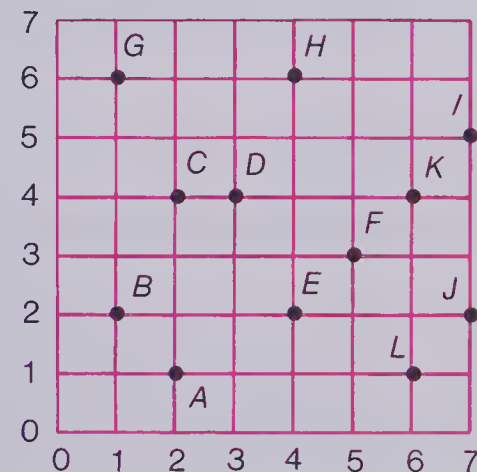
6. Write the ordered pair for each point.

(a) A (b) J (c) C (d) I

7. What letter is identified by:

(a) (4, 2)? (b) (4, 6)?

(c) (1, 6)? (d) (3, 4)?



189

8. Draw a broken line graph to show this information.

Time of Day	08:00	10:00	12:00	14:00	16:00
Temperature	4°C	5°C	16°C	14°C	6°C

180

Extra Practice — Chapter Seven

1. List each number as even or odd.

207

(a) 25 (b) 38 (c) 94 (d) 102 (e) 271 (f) 400 (g) 553

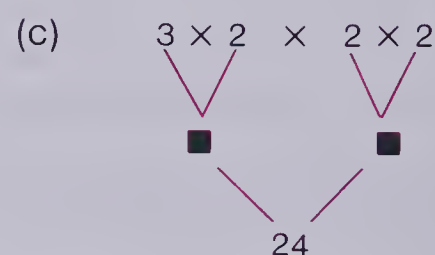
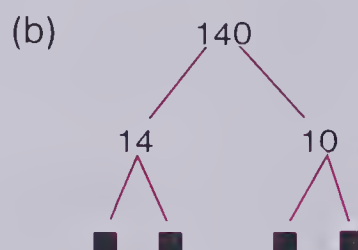
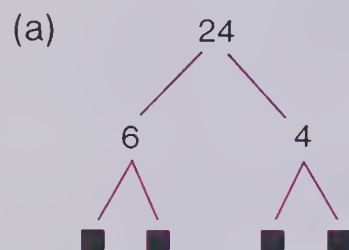
2. Which of the following are divisible by 3?

209

(a) 235 (b) 492 (c) 552 (d) 3445 (e) 9381

3. Copy and complete these factor trees.

212



4. (a) Use 8 squares.
 (b) How many rectangles can you make?
 (c) Is 8 a prime or composite number?

213

5. (a) List the factors of 10.
 (b) List the factors of 30.
 (c) Draw circles around the factors common to 10 and 30.

216

6. (a) Write the first 4 multiples of 15.
 (b) Write the first 4 multiples of 20.
 (c) Write the least common multiple.

221

7. Copy and complete.

222

(a) $10^3 = 10 \times \blacksquare \times \blacksquare$

(b) $10 \times 10 \times 10 \times 10 = 10^\blacksquare$

(c) $10^2 = \blacksquare \times \blacksquare$

(d) $10\,000 = 10^\blacksquare$

Extra Practice—Chapter Seven

1. Which of these numbers are divisible by 3? 209
(a) 17 (b) 39 (c) 69 (d) 114 (e) 555
2. Which of these numbers are divisible by 5? 208
(a) 67 (b) 1560 (c) 3555 (d) 7009 (e) 8005
3. Which of these numbers are divisible by 9? 209
(a) 111 (b) 229 (c) 162 (d) 1098 (e) 70 002
4. Which of these numbers are divisible by 4? 207
(a) 44 (b) 561 (c) 1704 (d) 58 724 (e) 64 312
5. Express the following as the product of prime factors. 214
(a) 56 (b) 84 (c) 64 (d) 76 (e) 124
6. Which are prime? composite? 213
(a) 11 (b) 57 (c) 66 (d) 98 (e) 71
7. Write the first 4 multiples of each. 219
(a) 3 (b) 9 (c) 15 (d) 25 (e) 50
8. Write the least common multiple of each pair. 221
(a) 3, 4 (b) 6, 8 (c) 5, 10 (d) 5, 7 (e) 4, 12
9. Write the greatest common factor of each pair. 217
(a) 6, 8 (b) 10, 20 (c) 12, 20 (d) 10, 15 (e) 8, 12
10. Which of the following are true? 198-202
(a) $512 \times 1 = 512$ (b) $6 \times 0 = 6$ (c) $27 \times 43 = 43 \times 27$
(d) $7 \div 0 = 7$ (e) $0 \div 7 = 0$ (f) $9 + 5 = 5 + 9$
(g) $52 \div 3 = 3 \div 52$ (h) $9 \div 0 = 0$ (i) $16 - 4 = 4 - 16$

Extra Practice—Chapter Eight

1. Are these fractions equivalent? (Use cross products to check.)

242

(a) $\frac{3}{5}, \frac{9}{15}$

(b) $\frac{1}{2}, \frac{5}{11}$

(c) $\frac{3}{4}, \frac{6}{10}$

(d) $\frac{2}{3}, \frac{6}{9}$

Perform the indicated operations.

2. (a) $\frac{1}{2}$ of 12

(b) $\frac{4}{5}$ of 30 ²³⁰

(c) $\frac{3}{10} + \frac{7}{10}$

(d) $\frac{3}{4} + \frac{1}{8}$

3. (a) $\frac{1}{5} + \frac{2}{3}$ ²⁴⁶

(b) $\frac{9}{10} - \frac{3}{10}$

(c) $\frac{5}{6} - \frac{1}{2}$

(d) $\frac{7}{8} - \frac{2}{5}$ ²⁴⁷

4. (a)
$$\begin{array}{r} 5\frac{1}{6} \\ + 3\frac{5}{6} \\ \hline \end{array}$$

(b)
$$\begin{array}{r} 3\frac{1}{2} \\ + 1\frac{3}{8} \\ \hline \end{array}$$

(c)
$$\begin{array}{r} 9\frac{4}{5} \\ - 2\frac{1}{2} \\ \hline \end{array}$$
 ²⁵⁰

(d)
$$\begin{array}{r} 20.73 \\ - 8.49 \\ \hline \end{array}$$

5. Express each fraction as a percent.

257

(a) $\frac{53}{100}$

(b) $\frac{3}{10}$

(c) $\frac{9}{25}$

(d) $\frac{13}{50}$

6. Write as a decimal.

258

(a) $\frac{93}{100}$

(b) $\frac{6}{25}$

(c) 72%

(d) 20%

7. Write as a fraction.

236

(a) 0.5

(b) 0.48

(c) 3.2

(d) 0.72

Solve.

8. (a) 50% of 20.

(b) 40% of \$60

(c) 10% of \$350

(d) 90% of \$50 ²⁵⁹

9. Sari scored 12 bull's-eyes in darts out of 50 darts thrown.
What percent of her darts hit the bull's-eye?

260

10. Maki saved 30% of his paper route earnings.
Last year he had made \$600 selling papers.
How much did he save last year?

261

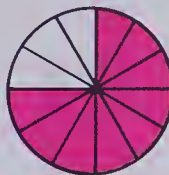
Extra Practice — Chapter Eight

1. What fraction is coloured?

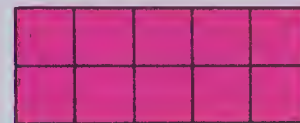
(a)



(b)



(c)



229

2. Write equivalent fractions.

(a) $\frac{1}{4} = \frac{\blacksquare}{12}$

(b) $\frac{3}{5} = \frac{\blacksquare}{10}$

(c) $\frac{7}{8} = \frac{\blacksquare}{24}$

(d) $\frac{6}{10} = \frac{\blacksquare}{100}$

240

3. Add or subtract.

(a) $\frac{1}{2} + \frac{1}{4}$

(b) $\frac{1}{4} + \frac{2}{5}$

(c) $\frac{3}{8} + \frac{1}{2}$

(d) $\frac{5}{8} - \frac{1}{2}$

(e) $\frac{7}{10} - \frac{1}{2}$

(f) $\frac{7}{8} - \frac{3}{5}$

(g) $\frac{7}{8} - \frac{1}{4}$

(h) $\frac{1}{3} + \frac{1}{9}$

(i) $3\frac{1}{4}$
+ $2\frac{1}{3}$

(j) $5\frac{7}{8}$
- $2\frac{1}{2}$

(k) $6\frac{4}{5}$
- $1\frac{3}{10}$

(l) $7\frac{3}{5}$
+ $4\frac{1}{6}$

various

4. Write each as a percent.

(a) $\frac{27}{100}$

(b) $\frac{5}{10}$

(c) $\frac{19}{25}$

(d) $\frac{41}{50}$

(e) $\frac{3}{5}$

257

5. Write each as a decimal.

(a) $\frac{87}{100}$

(b) $\frac{5}{25}$

(c) 45%

(d) 90%

(e) $\frac{15}{25}$

258

6. Find.

(a) 30% of 80

(b) 60% of 120

(c) 80% of \$50

259

7. Jill got 18 out of 20 marks on a test.
What percent did she get correct?

8. The regular price for a pair of hockey skates is \$34.
They are on sale at 80% of the regular price.
What is the sale price?

261

9. Use cross products. Copy and replace each \bullet with $<$, $>$, or $=$.

(a) $\frac{4}{5} \bullet \frac{5}{8}$

(b) $\frac{5}{7} \bullet \frac{6}{8}$

(c) $\frac{8}{12} \bullet \frac{10}{16}$

(d) $\frac{7}{15} \bullet \frac{22}{45}$

242

Extra Practice—Chapter Nine

Show your estimates for each, then calculate.

1. (a)	$\begin{array}{r} 465 \\ + 219 \\ \hline \end{array}$	(b)	$\begin{array}{r} 690 \\ + 187 \\ \hline \end{array}$	(c)	$\begin{array}{r} 523 \\ - 176 \\ \hline \end{array}$	(d)	$\begin{array}{r} 403 \\ - 265 \\ \hline \end{array}$	(e)	$\begin{array}{r} 750 \\ - 463 \\ \hline \end{array}$
--------	---	-----	---	-----	---	-----	---	-----	---

2. (a)	$\begin{array}{r} 2468 \\ + 1973 \\ \hline \end{array}$	(b)	$\begin{array}{r} 5079 \\ + 3185 \\ \hline \end{array}$	(c)	$\begin{array}{r} 3412 \\ - 1875 \\ \hline \end{array}$	(d)	$\begin{array}{r} 9103 \\ - 4719 \\ \hline \end{array}$	(e)	$\begin{array}{r} 7033 \\ - 4816 \\ \hline \end{array}$	268
--------	---	-----	---	-----	---	-----	---	-----	---	-----

3. (a)	$\begin{array}{r} 37 \\ \times 6 \\ \hline \end{array}$	(b)	$\begin{array}{r} 296 \\ \times 5 \\ \hline \end{array}$	(c)	$\begin{array}{r} 84 \\ \times 27 \\ \hline \end{array}$	(d)	$\begin{array}{r} 63 \\ \times 45 \\ \hline \end{array}$	(e)	$\begin{array}{r} 78 \\ \times 34 \\ \hline \end{array}$	270
--------	---	-----	--	-----	--	-----	--	-----	--	-----

4. Use short division to find the quotients.

(a)	$6 \overline{)78}$	(b)	$3 \overline{)87}$	(c)	$4 \overline{)228}$	(d)	$7 \overline{)441}$	(e)	$5 \overline{)245}$	272
-----	--------------------	-----	--------------------	-----	---------------------	-----	---------------------	-----	---------------------	-----

5. Divide. Express the remainder as a fraction.

(a)	$7 \overline{)955}$	(b)	$8 \overline{)973}$	(c)	$3 \overline{)1024}$	(d)	$8 \overline{)1211}$	(e)	$6 \overline{)2231}$	273
-----	---------------------	-----	---------------------	-----	----------------------	-----	----------------------	-----	----------------------	-----

Divide.

6. (a)	$5 \overline{)4.5}$	(b)	$7 \overline{)4.9}$	(c)	$4 \overline{)28.52}$	(d)	$8 \overline{)29.12}$	(e)	$7 \overline{)15.75}$	274
--------	---------------------	-----	---------------------	-----	-----------------------	-----	-----------------------	-----	-----------------------	-----

7. (a)	$41 \overline{)24.6}$	(b)	$29 \overline{)14.5}$	(c)	$37 \overline{)96.2}$	(d)	$22 \overline{)81.4}$	(e)	$27 \overline{)91.8}$	276
--------	-----------------------	-----	-----------------------	-----	-----------------------	-----	-----------------------	-----	-----------------------	-----

8. (a)	$32 \overline{)78.72}$	(b)	$24 \overline{)93.84}$	(c)	$35 \overline{)78.75}$	(d)	$21 \overline{)70.98}$	(e)	$43 \overline{)99.33}$	277
--------	------------------------	-----	------------------------	-----	------------------------	-----	------------------------	-----	------------------------	-----

Perform the operations.

9. (a)	$5 + 7 \times 3$	(b)	$12 + 8 - 4$	(c)	$14 + 10 \div 2$	282
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10. (a)	$20 \div 4 - 3$	(b)	$(16 - 5) \times 3$	(c)	$30 \div (2 \times 5)$
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11. (a)	$6 \times 7 + 3 \times 8$	(b)	$(21 - 9) \times (12 \div 3)$	(c)	$18 - 2 \times 7 - 1$
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Extra Practice—Chapter Nine

1. Show your estimates for each, then calculate.

$$\begin{array}{r} (a) \quad 290 \\ + 415 \\ \hline \end{array}$$

$$\begin{array}{r} (b) \quad 988 \quad 268 \\ - 782 \\ \hline \end{array}$$

$$\begin{array}{r} (c) \quad 62 \\ \times 59 \\ \hline \end{array}$$

$$(d) \quad 3538 \times 5 \quad 270$$

2. Use short division to find the quotients.

$$(a) \quad 7 \overline{)147}$$

$$(b) \quad 5 \overline{)165}$$

$$(c) \quad 8 \overline{)424}$$

$$(d) \quad 6 \overline{)1830} \quad 272$$

$$(e) \quad 9 \overline{)207}$$

$$(f) \quad 4 \overline{)224}$$

$$(g) \quad 7 \overline{)16.1}$$

$$(h) \quad 8 \overline{)81.6}$$

3. Divide. Express the remainder as a fraction.

$$(a) \quad 7 \overline{)258}$$

$$(b) \quad 8 \overline{)811}$$

$$(c) \quad 12 \overline{)329}$$

$$(d) \quad 36 \overline{)1987} \quad 273$$

4. Divide.

$$(a) \quad 22 \overline{)26.4}$$

$$(b) \quad 36 \overline{)151.2}$$

$$(c) \quad 41 \overline{)147.6}$$

$$(d) \quad 57 \overline{)18.24} \quad 276$$

$$(e) \quad 20 \overline{)6.6}$$

$$(f) \quad 28 \overline{)7.28}$$

$$(g) \quad 19 \overline{)3.61}$$

$$(h) \quad 16 \overline{)11.36}$$

5. Perform the operations.

$$(a) \quad (17 - 9) \times 3$$

$$(b) \quad 18 - 2 \times 5$$

$$(c) \quad 64 + 12 \div 3 \quad 282$$

$$(d) \quad 4 \times (6 + 1) - 2$$

$$(e) \quad 6 \times 5 + 5 \div 5$$

$$(f) \quad 3 \div 3 + 9 \div 9$$

6. Calculate the average of each set of numbers.

$$(a) \quad 31, 62, 59, 64$$

$$(b) \quad 123, 415, 215, 175, 222 \quad 286$$

7. Copy and insert brackets to make each number sentence true.

$$(a) \quad 3 + 9 - 3 + 8 = 1$$

$$(b) \quad 56 - 9 - 4 + 2 = 45 \quad 282$$

$$(c) \quad 60 \div 10 + 5 + 5 = 16$$

$$(d) \quad 72 \div 9 + 3 - 3 = 8$$

8. 187.2 cm of wire is cut into 8 equal pieces. How long is each piece?

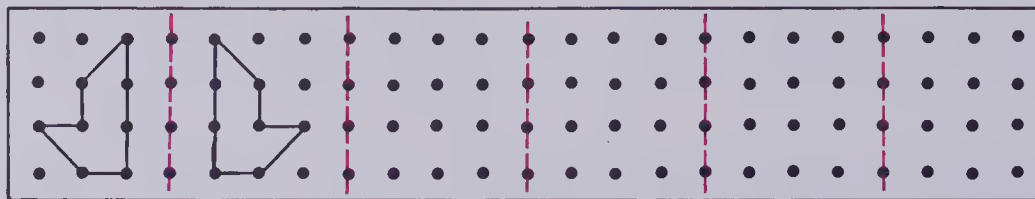
275

Extra Practice—Chapter Ten

Copy and complete these patterns.

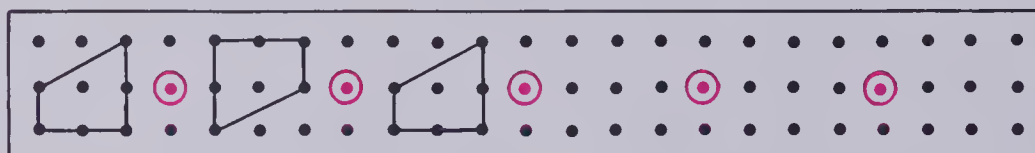
298

1. Flip images



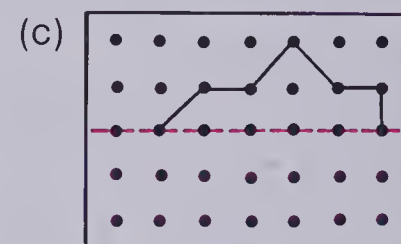
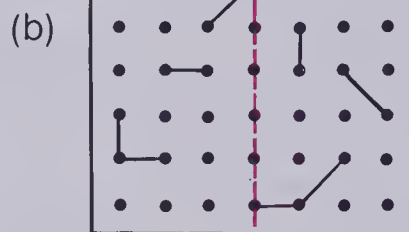
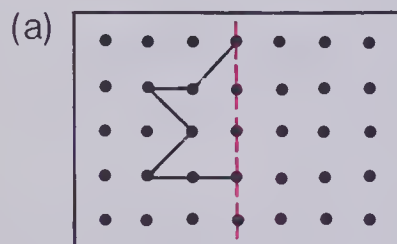
2. $\frac{1}{2}$ turn images

308



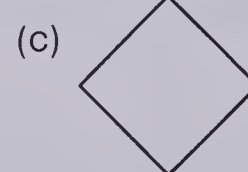
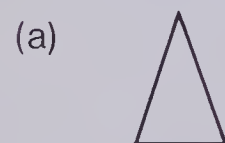
3. Copy and complete these flip images.

304



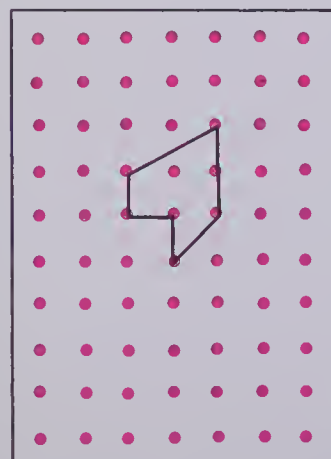
4. Copy and draw in *all* lines of symmetry. (Use a dotted line.)

302



5. Copy this figure and draw the slide images of this figure.

306-307



- (a) Right 2, up 2.
 (b) Left 2, up 1.
 (c) Right 1, down 4.
 (d) Left 2, down 3.

Label the new images (a), (b), (c), and (d).

Extra Practice — Chapter Ten

1. Trace each. Complete the mirror pattern.

304

(a)



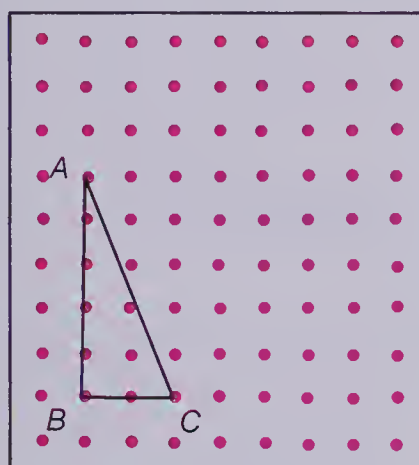
(b)



2. Trace $\triangle ABC$.

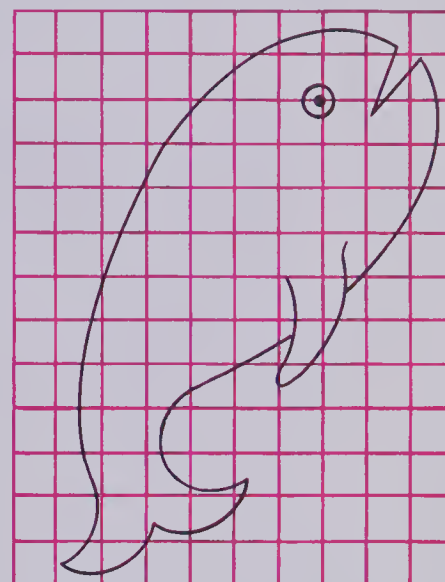
306

Then make a pattern to show a slide right 5, up 3.



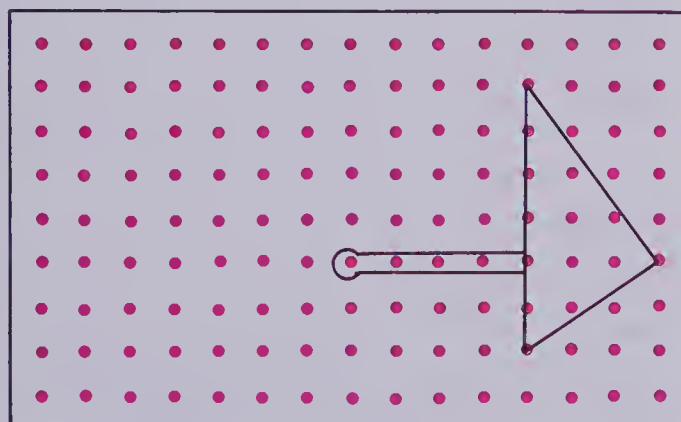
3. Copy this whale on larger grid paper.

314



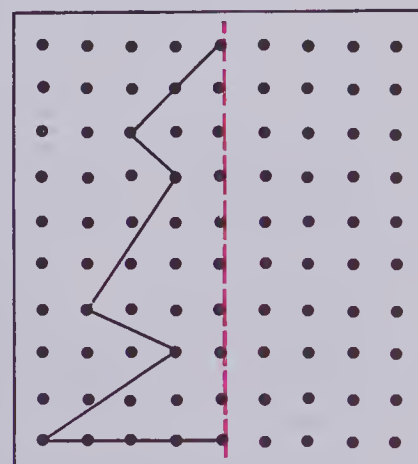
4. Copy and draw a $\frac{1}{2}$ turn.

308



5. Copy and make a flip pattern.

304



6. Draw a pattern to make a wallpaper design using slides, turns, and/or flips.

312-313

Answers to Selected Problems

Chapter 1

- Page 1** 1. 35 4. (b) $413 + 216 = 629$
5. (a) $826 - 613 = 213$
- Page 2** 1. $14 + 7 = 21$; $8 + 7 = 15$;
 $12 + 7 = 19$; $34 + 7 = 41$; $19 + 7 = 26$
- Page 5** 2. (a) Books
How many books altogether?
"A" shelf — 37 books.
"B" shelf — 26 books.
Addition
(b) $37 + 26 = \blacksquare$
(c) $37 + 26 = 63$
(d) There are 63 books altogether.
- Page 6** 1. 479 km 4. 943 5. 894
- Page 10** 1. 0.6 2. 0.52
- Page 11** 1. 6.7 6. 5.1 11. 9.1 12. 5.4
- Page 12** 1. \$54.07 5. \$46.61
- Page 13** 1. 4.6 kg
- Page 14** 1. four thousand, seven hundred
twenty-five 5. 3072 9. 3256 13. 6517
- Page 15** 1. seven thousand, two hundred
five decimal four six 4. 2463.58
8. 4236.72
- Page 16** 1. \$4002.58 5. \$3574.26
- Page 17** 2. $617 < 652$ 7. $524.2 < 524.6$
12. $206.53 > 206.51$
- Page 21** 1. 743 423 13. 279 265
- Page 23** 1. (b) 6 means 6 thousands.
- Page 27** 2. 4780 10. 6800 18. 6000
- Page 28** 1. (b) 3.2 2. (b) 5.24
- Page 29** 1. 14 000 000 9. 2 000 000
- Page 30** 1. 23 2. 16 12. 40 15. 90
17. 46 22. 13
- Page 31** 4. MCMLXXV

Chapter 2

- Page 41** 1. ray RT 2. ray PS
- Page 46** 1. Angle RST is congruent to angle WVU .
- Page 48** 1. 90°
- Page 56** 1. B matches P . D matches N .
2. BC matches PR . AD matches MN .
- Page 64** 1. $\$70 - \$30 = \$40$

Chapter 3

- Page 70** 7. 3900
- Page 71** 1. (a) 6 (b) 60 (c) 600 (d) 6000
- Page 72** 2. $8241 = (8 \times 1000) + (2 \times 100) +$
 $(4 \times 10) + (1 \times 1) = 8000 + 200 +$
 $40 + 1$ 3. $6504 = (6 \times 1000) +$
 $(5 \times 100) + (0 \times 10) + (4 \times 1) = 6000$
 $+ 500 + 0 + 4$ 17. 4762 18. 3509
- Page 73** 1. 245 2. 138 3. 450
- Page 74** 1. 2562 2. 5784 6. 4080 7. 4650
9. 3535 10. 1224
- Page 75** 1. 21 504 2. 24 375 5. 29 428
6. 27 192 9. 222 888 10. 312 375
13. 140 692 14. 117 649
- Page 76** 1. $3 \times 60 = 180$ 2. $7 \times 200 = 1400$
- Page 77** 5. 1.4
- Page 78** 1. 223.2 2. 122.1
- Page 79** 1. \$9.80 5. \$249.36 9. \$521.45
- Page 81** 3. (a) Propane Bar-B-Q's
What is the total value?
3 propane Bar-B-Q's. \$179.85 each.
Multiply

- (b) $3 \times \$179.85 = N$
 (c) $3 \times \$179.85 = \539.55
 (d) The total value of the propane Bar-B-Q's is \$539.55.

- Page 82** 1. 8.478 7. 16.251
Page 85 1. 185 2. 1290; 1634 3. 450;
 (9 \times 50); 500 4. 1116 5. 1702
Page 86 1. 2832 2. 14 650; 15 529
 3. (7 \times 504); 30 240; 33 768 4. 7824
 5. 13 024
Page 87 1. $60 \times 80 = 4800$ 7. 1176
Page 88 1. 33 640
Page 92 1. 8.5 2. 17.5
Page 93 1. 222.6 2. 1513.4
Page 94 3. 21.85 4. 0.272 13. 4.834
 14. 1.4568
Page 95 3. 4.896 8. 2.5854 13. 1.545 96

Chapter 4

- Page 101** 1. $21 \div 3 = 7$; $21 \div 7 = 3$ 8. "How many groups of 6 in 30?"; 5
 16. $56 \div 7 = 8$
Page 103 1. "How many groups?"; $40 \div 8 = 5$
Page 104 1. 23 2. 36 11. 46 12. 38 13. 43
Page 105 1. 23 2. 37 3. 16 4. 14 8. 24
 9. 23
Page 106 1. 124 2. 327 3. 122 4. 123
Page 107 5. 50 6. 0.45 7. 200 8. 60
Page 108 2. 50 6. 50
Page 109 1. 40; 4; 0.4; 0.04
 2. 50; 5; 0.5; 0.05
 3. 67.35; 0.14; 0.08; 2.5
Page 110 1. 300 cm 6. 2 m
Page 111 1. 60 dm 5. 400 cm 9. 13 m 13. 5 m

- Page 112** 1. 43 dm 5. 270 cm 9. 4.5 m
 13. 2.6 m

- Page 113** 5. 2000 m 11. 7 km

- Page 115** 1. (a) 9.867 m (b) 98.67 dm
 (c) 986.7 cm (d) 9867 mm
 9. (a) 25.41 dm (b) 254.1 cm
 (c) 2541 mm

- Page 116** 1. 11.4 km

- Page 118** 1. 3 cans

- Page 119** 3. 3800 mL 7. 4 L

- Page 120** 1. 2.5 kg 3. 0.25 kg 9. 4000 g
 11. 1200 g

- Page 122** 1. 1000 kg 8. The approximate mass of a large horse is 1 t. A large bull is less than 1 t.

- Page 125** 1. (a) 3.3°C (b) 22.7°C (c) 2.2°C

- Page 126** 1. 24 h = 1440 min
 7 d = 168 h
 1 week = 168 h
 2. 1 a = 8760 h
 1 d = 1440 min
 1 h = 3600 s

- Page 127** 1. (a) 10:00 (b) 07:00 (c) 10:00
 (d) 11:00 2. (a) 08:00 (b) 10:00
 (c) 11:00 (d) 12:30

Chapter 5

- Page 134** 1. 5 2. 8 3. 8 16. 6 17. 3 18. 4
Page 135 2. 3 3. 50
Page 136 1. 7 2. 6 3. 7 4. 7
Page 137 1. 8 2. 4 3. 6 4. 8 5. 4 6. 5
Page 138 1. 7 2. 8 3. 8 4. 7 5. 5 6. 5
Page 139 1. 51 3. 24
Page 141 1. 32 2. 142 3. 35 4. 26 11. 134
 12. 325

Page 142 1. 703 2. 509 3. 306 4. 205
5. 609

Page 143 1. 206 2. 307 3. 109 4. 203
5. 107

Page 144 4. 25 5. 18 6. 36 7. 53

Page 145 1. 26 R 3 2. 47 R 1 3. 34 R 12
4. (a) 91 (b) 1 12. (a) 7 (b) 5
13. (a) 8 (b) 29

Page 146 1. 42 R 5 2. 28 R 1 3. 32 R 12
4. 56 R 1 5. 84 R 3 12. 18 R 9

Page 153 1. 21 cm^2

Page 154 1. 35 2. 69 3. 52 km^2

Page 155 1. (a) 5 squares (b) 3 rows (c) 15
(d) 15 square units 2. 50 cm^2

Page 156 1. (a) 16 cm^2 (b) 2 triangles (c) yes
(d) yes (e) 8 cm^2

Page 160 1. 72 cm^3 2. 24 cm^3

Page 161 8. 180 cm^3 20. 120 cubes

Chapter 6

Page 165 1. 2 2. 2 3. 3 7. 4

Page 166 1. $3 + 2 < 7$ 2. $5 \times 3 > 8$
3. $6 - 4 > 1$ 4. $26 \div 2 = 13$
19. $\blacksquare = 0, 1$ 22. $\blacksquare = 3, 4, 5$
25. $N = 0, 1$ 28. $T = 4, 5, 6, \dots$

Page 167 1. 2 11. $N = 0, 1, 2$
12. $T = 0, 1, 2, 3, 4$

Page 186 1. Tewari multiplied the number of hours
by 50. 2. 75 km; 125 km 3. Multiply
the number of hours by 50.

Page 188 6. (a) Rob 7. (a) (1, 2)

Page 189 1. (a) Moose tent 2. (a) (1, 3)

Page 191 1. (a) L 2. (a) Q

Chapter 7

Page 198 1. $N = 10$; yes 2. $N = 822$; yes

Page 200 1. $N = 63$; yes

Page 211 3. $1 \times 24 = 24$; $2 \times 12 = 24$;
 $3 \times 8 = 24$; $4 \times 6 = 24$. All the factors
of 24 are 1, 24, 2, 12, 3, 8, 4, 6. All the
factors of 24 listed from the smallest to
the largest are 1, 2, 3, 4, 6, 8, 12, 24.

Page 214 3. (a) $20 \rightarrow 2, 2, 5$ (b) $60 \rightarrow 2, 2, 3, 5$
(c) $28 \rightarrow 2, 2, 7$

Page 216 1. (a) $6 \rightarrow \triangle 1, \triangle 2$ 3, 6
(b) $8 \rightarrow \triangle 1, \triangle 2$ 4, 8

Page 219 1. (a) 4, 8, 12, 16, 20, 24, 28, 32, 36.

Chapter 8

Page 229 1. 5 compact cars; 8 cars in all.

(a) $\frac{5}{8}$ (b) $\frac{3}{8}$ 2. 3 cubes;
5 boxes in all. (a) $\frac{3}{5}$ (b) $\frac{2}{5}$

Page 230 1. 2 2. 4 3. 5 9. 5 10. 8

Page 231 1. 8 2. 6 3. 8

Page 232 1. $\blacksquare = \frac{1}{3}, \frac{1}{4}, \frac{1}{5}$ 2. $\blacksquare = \frac{1}{4}, \frac{1}{5}$

Page 233 1. $\frac{4}{5}$ 11. $\frac{3}{5}$

Page 234 1. $\frac{6}{4}$ or $1\frac{2}{4}$ 6. $\frac{12}{8}$ or $1\frac{4}{8}$

Page 235 1. 0.2 6. $\frac{3}{10}$

Page 236 2. $\frac{13}{100}$ 3. $\frac{716}{1000}$ 4. $\frac{25}{100}$ 12. 0.637
13. 0.5

Page 239 3. $\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12} = \frac{10}{15} = \frac{12}{18}$
 $\left(= \frac{14}{21} = \frac{16}{24} = \frac{18}{27} = \frac{20}{30} \right)$ 20. An
improper fraction is a fraction whose
numerator is equal to or greater than its
denominator.

Page 240 1. $\frac{10}{15}$ 2. $\frac{18}{24}$ 3. $\frac{10}{16}$

Page 241 1. $\frac{1}{5}$ 2. $\frac{1}{4}$

Page 242 3. $2 \times 3 = 6$, $1 \times 5 = 5$; $\frac{1}{2}$ and $\frac{3}{5}$ are not equivalent fractions.

Page 243 3. $\frac{2}{7} = \frac{4}{14}$

Page 244 1. $1\frac{1}{3}$ 2. $1\frac{3}{4}$ 16. $2\frac{1}{2}$ 17. $1\frac{1}{2}$

Page 245 1. $\frac{5}{6}$ 2. $\frac{11}{15}$

Page 246 1. $\frac{11}{12}$ 2. $\frac{13}{20}$

Page 247 1. $\frac{5}{12}$ 2. $\frac{3}{20}$

Page 248 1. $\frac{17}{20}$ 2. $\frac{23}{30}$ 3. $\frac{5}{24}$

Page 249 1. $\frac{8}{10}$ or $\frac{4}{5}$ 2. $\frac{33}{20}$ or $1\frac{13}{20}$ 9. $\frac{2}{10}$ or $\frac{1}{5}$
10. $\frac{7}{12}$

Page 250 1. $7\frac{3}{5}$ 2. $7\frac{8}{10}$ or $7\frac{4}{5}$ 7. $8\frac{13}{20}$ 8. $9\frac{5}{6}$

Page 251 1. (a) 30 (b) 17 (c) 13 (d) 17:30
(e) 13:30

Page 252 1. (a) Mike: 30:24; Gerard: 21:24;
Norm: 7:24; Sergio: 18:24; Pierre: 12:24
(b) Mike

Page 253 1. 0.75 2. 0.8 3. 0.375

Page 254 1. (a) $\frac{40}{100}$ (b) 40% (c) 60%
2. (a) $\frac{70}{100}$ (b) 70% (c) 30% 9. 40%
10. 34%

Page 257 1. 50% 2. 75% 3. 80%

Page 258 1. 0.25 2. 0.16

Page 259 1. \$3.20 2. \$12.50

Page 260 1. (a) 60% (b) 20 (c) 40%

Page 272 1. 14 2. 25 3. 12 4. 31

Page 273 15. $141\frac{3}{6}$ or $141\frac{1}{2}$

Page 274 1. 0.7 2. 0.8 3. 0.4 12. 2.8 13. 2.3
14. 2.3

Page 275 1. 3.27 2. 1.95

Page 276 1. 0.5 2. 0.8 3. 0.6 14. 2.3 15. 3.6

Page 277 1. 1.98 2. 2.15

Page 279 1. 60 2. 59

Page 280 1. (a) 13 (b) 16 2. (a) 6 (b) 8

Page 281 1. 17 2. 6 3. 1

Page 282 1. 5 2. 4 3. 30 17. 3 18. 0

Chapter 9

Page 270 1. $40 \times 30 = 1200$; $50 \times 40 = 2000$;
 $47 \times 32 = 1504$. The product is in the
ball park. 4. 3312 5. 4505

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Holt, Rinehart and Winston of Canada, Limited

ISBN 0-03-920037-X

